# ABSTRACT

OF

# The Proceedings of the Forty-sixth Annual Meeting of the Association of Life Insurance Medical Directors of America

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An Abstract of the Proceedings

OF THE

# Association of Life Insurance Medical Directors of America

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## FORTY-SIXTH ANNUAL MEETING

The Forty-sixth Annual Meeting of the Association of Life Insurance Medical Directors of America was held at the Waldorf-Astoria Hotel, New York City, on October 17 and 18, 1935.

The following members, delegates and guests were present at some time during the sessions: Drs. J. W. Abbott, W. C. Alvarez, E. M. Armstrong, T. M. Armstrong, W. B. Aten, H. A. Bancel, G. H. Barber, J. T. J. Battle, E. W. Beckwith, J. E. Bee, R. A. Behrman, M. B. Bender, F. M. Beresford, E. B. Bigelow, J. R. Biggs, C. C. Birchard, W. F. Blackford, H E. Bogart, J. E. Boland, William Bolt, E. C. Bonnett, J. T. Bowman, W. M. Bradshaw, F. G. Brathwaite, A. W. Bromer, J. L. Brooks, C. T. Brown, H. B. Brown, B. F. Byrd, P. E. Carlisle, E. J. Campbell, F. H. Carber, C. L. Christiernin, C. P. Clark, E. A. Colton, H. W. Cook, D. B. Cragin, Jennings Crawford, R. M. Daley, H. D. Delamere, E. J. Dewees, E. G. Dewis, T. H. Dickson, Jr., E. S. Dillon, W. W. Dinsmore, J. H. Dunkley, O M. Eakins, J. L. Evans, F. C. Evers, J. G. Falconer, R. K. Farnham, H. H. Fellows, W. E. Ferguson, R. M. Filson, R. A. Fraser, E. M. Freeland, F. I. Ganot, Kenneth Gardner, R. A. Goodell, R. J. Graves, F. L. Grosvenor, F. W. Hagney, Llewellyn Hall, W. F. Hamilton, W. C. Hausheer, J. D. Heacock, W. D. Heaton, C. A.

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Total attendance at all sessions, 192.

During the past year, three members of our Association have died. The following testimonials to their memory have been prepared by representatives of the Association.

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## DR. LEFFERTS HUTTON

Dr. Lefferts Hutton, Assistant Medical Director of the Mutual Life Insurance Company of New York, died suddenly on August 14th, 1935, without any warning.

Dr. Hutton was born in New York City on December 13th, 1879, and received his preliminary education at a private school in New York, graduating from Columbia College in 1902. From there he went to the College of Physicians and Surgeons, Columbia University, graduating in 1905. This was followed by two years' interneship at St. Luke's Hospital. From 1907 until 1916 he was in the active practice of his profession in New York City. He was commissioned as First Lieutenant in the Medical Corps of the Seventh New York Infantry in 1914 and served as Lieutenant and Captain in the Medical Corps of this regiment on Mexican Border Service. In June, 1917, he became Major and in September, 1917, was appointed Assistant Division Surgeon, Sixth Division of the U. S. War Service. He acted as Assistant Division Surgeon for the 27th Division during the entire period they were in France and was cited in Division Special Orders in February, 1919, and promoted to the rank of Lieutenant Colonel in the Medical Corps.

He was an officer of the Society of the Cincinnati in the State of New York, and in the New York Chapter of the Society of Colonial Wars.

Dr. Hutton came to the Mutual Life Insurance Company of New York in April, 1920, and was appointed Assistant Medical Director in 1925. He was a faithful officer, a sincere friend and a true and loyal business associate. He was unassuming—modest and always cheerful and optimistic—and his ever ready sympathy endeared him to all with whom he came in contact. His sudden and unexpected death comes as a personal loss to all of his associates.

## DR. CHARLES NAUMANN McCLOUD

Charles Naumann McCloud was born in St. Paul, Minnesota, February 9, 1872. He died in that city, August 13, 1935, of tularemia.

Doctor McCloud received the degree of Doctor of Pharmacy at the University of Minnesota in 1895 and the degree of Doctor of Medicine from the same instituition in 1901. Having served his interneship at the City and County Hospital in St. Paul, he served as Assistant City Physician in St. Paul in 1902 and 1903.

In the fall of 1903, Doctor McCloud was appointed Medical Referee of The Minnesota Mutual Life Insurance Company. He became its Medical Director in 1908, a member of its Board of Trustees in 1920, its Second Vice President and Medical Director in 1929 and Vice President and Medical Director in 1934. He was a member of the Ramsey County Medical Society, of the Minnesota State Medical Association, of the American Medical Association, of the Minnesota Academy of Medicine, of the Association of Life Insurance Medical Directors and of the Medical Section of the American Life Convention, of which latter group he had been Chairman. He served for many years on the staff of St. Luke's Hospital and Charles T. Miller Hospital, both in St. Paul. In addition to his duties as Medical Director, Doctor McCloud enjoyed a wide general practice for many years, and so endeared himself to the families in which he practiced that many of them felt they could not get along without his services even after he had retired from general practice to devote himself entirely to Life Insurance Medicine.

A man of genial and lovable nature, he possessed to an unusual degree the faculty of making friends and numbered them by the hundreds. To them, his death came as a personal loss. He will long be remembered not only by his former patients, but by his associates and fellow-workers. Such a man as he, comes along only too seldom and when he has gone, the place which was peculiarly his own, cannot be filled.

## JOSEPH PINCKNEY TURNER, M. D.

Dr. Joseph Pinckney Turner, of Greensboro, N. C., died at his home Sunday night, September 29, 1935. He apparently was in his usual health until stricken by a heart attack which lasted only a few minutes.

He was born in Cool Springs, Iredell County, N. C., December 18, 1871, and reared there. After attending preparatory schools, including Oak Ridge, he finished his college work at Trinity College, now Duke University, and pursued his medical studies at the University of Maryland, from which college he graduated in 1896. In 1897, he came to Greensboro where for several years he was in general practice and surgery.

Shortly after coming to Greensboro, Dr. Turner became assistant medical director of the Security Life & Annuity Company and in 1912 when that Company was merged with the Jefferson Standard Life Insurance Company, he became medical director. Up to about 1915, he continued this work in addition to his private practice, but the steady increase in the volume of work as medical director necessitated the giving up of outside duties. He had been a member of the board of directors of the Company since organization and during the past several years had been a member of the executive committee and of the finance committee of the Company.

Dr. Turner in 1917-18 was elected chairman of the Medical Section of the American Life Convention, as an evidence of his ability and service in the life insurance field. He was a member of the Guilford County Medical Society, the Medical Society of the State of North Carolina, and the Association of Life Insurance Medical Directors of America.

The following paragraph from the tribute paid the Doctor by the Greensboro Daily News is quite apropos:

"In his life span here, Greensboro's growth kept pace with that of the institution with which he was identified; there is thus dual tribute, an enduring monument, to the service which he rendered, ministering first to the suffering, then to those who have felt and will feel the warmth of fiduciary protection and, be-

yond them although in these aggregate ministrations, to his community."

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Dr. Wells—Gentlemen, it may seem rather paradoxical for a presiding officer from the midwest to be called upon to welcome to New York a membership of which a very large percentage already reside in or around this City. Nevertheless, I do most heartily welcome you to this Convention and sincerely hope that your time here will be most pleasant, as well as profitable. If you find that the Committee has left undone anything which might add to your comfort or enjoyment, please do not hesitate to report the matter to the Committee.

Before proceeding with our scientific program I am going to ask for a few words from Dr. Samuel J. Streight, Medical Director of the Canada Life Assurance Company, and Chairman of our sister organization, the Medical Section of the American Life Convention. Dr. Streight.

Dr. Streight—Mr. President, and fellow members of the Association of Life Insurance Medical Directors: It is my very pleasant privilege to bring to you greetings and good wishes from the Medical Section of the American Life Convention.

Though separate organizations, we are united in a common purpose—the sane selection of risks. Sound underwriting demands a close study of human nature, and particularly is this true in the times through which we are passing. It is our duty to study carefully all factors, medical and otherwise, which may adversely affect mortality, with a view to increasing our ability to select the right kind of business.

In a period when returns from investments are shrinking while burdensome taxation and other expenses are increasing, it is increasingly evident that careful selection is the chief cornerstone of Life Insurance.

It is a pleasure to be with you, and I now, on behalf of the members of the Medical Section of the American Life Conven-

tion, extend to you a cordial invitation to meet with us at our Annual Meeting, which convenes at The Greenbriar, White Sulphur Springs, West Virginia, June 11th to 13th, 1936. Our discussions will be in the nature of an open forum, in which we will be happy to have any of you who care to attend participate.

DR. WELLS—The first paper on the program will be presented by Dr. Francis C. Evers, Medical Director of the New York Life Insurance Company. Although this is Dr. Evers' first appearance on one of our programs, I'm sure we all agree that anyone who has received his early training in medical underwriting from that "old master" Dr. Oscar Rogers, could not fail to marshall his statistical material in any but an entertaining and instructive manner. Dr. Evers.

## THE SIGNIFICANCE OF ALBUMINURIA

By Francis C. Evers, M. D.
*Medical Director, New York Life Insurance Company*

How to evaluate risks that present albumin in the urine or give past histories of albumin, has been a problem that has given medical selectors considerable concern for many years. From the time when all risks with albuminuria were rejected, we have seen cases accepted on a highly substandard basis, to the present when those showing albumin in small amounts without signs of nephritis are accepted on a standard basis or only slightly understandard. This present attitude is due to our understanding of functional or orthostatic albuminuria and is based largely on the Medico-Actuarial Investigation[1] of 1914, the Joint Committee's Report[2] of 1920, Rogers and Hunter's[3] paper of 1925 and the Medical Impairment Study[4] of 1929.

These studies, in addition to other recent studies, have been based on the frequency of occurrence, that is, whether intermittent or constant, combined with the amount found in the specimens, that is, whether "trace", "moderate" or "large amount".

Prior to the M.A.M.I. investigation it is apparent that there was an exceedingly careful selection exercised and that none were accepted until there was reason to believe that the presence of the albumin was temporary or unimportant, for in the two groups, albumin found on examination and one finding within two years of application, there were only 52 actual deaths which gave the ratio of actual to expected deaths of 113%.

In the Medical Impairment Study, with considerably more material, it was found that the selectors had been able to produce a satisfactory result in the standard material of the two groups—albumin, intermittent, trace, found on examination and albumin, constant, trace, found on examination. The ratio of actual to expected deaths being 99% and 102% respectively. In all

other groups, however, the mortality was distinctly unfavorable and may be summarized as follows:

| Found on Examination | | | | Actual Deaths | Ratio of Actual to Expected Deaths |
|---|---|---|---|---|---|
| Albumin, | intermittent, | trace | — substandard | 194 | 129% |
| " | " | moderate | " | 39 | 150% |
| " | " | large | " | 14 | 307% |
| " | constant | trace | " | 492 | 173% |
| " | " | moderate | — standard | 18 | 136% |
| " | " | moderate | — substandard | 200 | 174% |
| " | " | large | " | 70 | 298% |

The mortality ratio was distinctly higher at the later than the earlier durations and with regard to age at entry, it was highest in the age group 40—49. The note was made that the mortality in the large group of cases with a constant trace, substandard, and in those with large amounts of albumin either intermittent or constant, was considerably higher than had been anticipated.

We have felt for some time that the frequency of occurrence plus the amount of albumin in the urine is not the only criterion on which to base an opinion as to the advisability of the acceptance of a risk, and that those results of the M.I.S. which were unexpected, might be explained by other factors. By this we mean that the frequency of occurrence and amounts of albumin in the urine, especially in casual specimens such as we are forced to accept in Life Insurance medicine, are so dependent on the time of day the specimen is collected, diet, activity, posture and emotional reactions of the individual, that they are neither a true index of the functional capacity of the kidney or an index of the extent of damage present in the kidney, if there be any damage. This was not an entirely original idea with us, for in 1922 Dr. Eugene F. Russell[5] of the Mutual Life of New York said, "No distinction has been made between 'faint trace', 'trace', 'very faint trace', etc., as it is not believed that these findings alone influence mortality results. It is common knowledge that marked cases of nephritis may have a very faint trace of albumin one day, a large amount on the next or none at all."

It was decided, therefore, to study the cases accepted as albuminuria both as an impairment of the genito-urinary system alone, and as an impairment of the genito-urinary system combined with a significant impairment of some other system of the body. After our study was started this same idea was expressed at the Medical Section of the American Life Convention in April 1935, at which time the following question was presented in the "question box"—"Is the present numerical rating for nephritis based on the number of casts and percentage of albumin, correct and satisfactory?"

The material used was the original files of risks accepted, with albuminuria, by the New York Life Insurance Company from 1925 to 1933, carried to the anniversary in 1934, standard and substandard, men and women. For the purpose of our study these cases were divided into three groups:

GROUP I—Cases in which albumin occurred alone, either in the past history or in the physical findings, regardless of occurrence or amount.

GROUP II—Cases in which albumin occurred as above in addition to some other impairment of the genito-urinary system. This additional impairment included past unfavorable medical history, past adverse urinary findings, such as hematuria, pyuria and casts, as well as unfavorable history admitted at time of examination and adverse findings at time of acceptance. In the male it included prostatitis and other impairments that were considered to impair renal function, but in the female it did not include impairments that were related solely to the generative organs.

GROUP III—Cases in which albumin occurred as above in addition to a significant impairment of some other system, found either in the past or at the time of examination. We found it necessary to make arbitrary rules as to build and blood pressure. We

therefore included in Group III any case in which overweight or underweight caused the basic rating to be 125% or more, or any blood pressure in which either the systolic or diastolic equalled or exceeded 150 mm. and 100 mm. respectively.

The question will no doubt be raised as to what other impairments were included in this group and as to the homogeneity thereof. The vast majority of the added impairments, about 70%, of this group included heart murmurs, vascular changes, hypertension, pathological changes in the fundus of the eye, such symptoms as headaches, dizziness and vertigo appearing for the first time after age 40, which as a group represent the cardiovascular syndrome. We feel, therefore, that this group is essentially homogeneous from a clinico-pathological standpoint if not strictly so from an actuarial one.

The result of our mortality investigation of these three classes is summarized in the following table:

STANDARD AND SUBSTANDARD DATA COMBINED
(By Policies)

| | Actual Deaths | Expected Deaths by Co. Standard | Ratio of Actual to Expected |
|---|---|---|---|
| GROUP I | 78 | 83.2 | 94% |
| GROUP II | 100 | 71.7 | 139% |
| GROUP III | 397 | 127.1 | 312% |

This comparison of actual with the expected is in accordance with the Company's standard for issues of 1925 to 1933, carried to the anniversary in 1934, which was assumed to be the same as the recently published Basic Table 1925-1932 extended by the addition of a ninth year of exposure. This standard has no relation to the experience anticipated or provided for by the ratings imposed.

In Group I the majority of cases were accepted at standard rates or as standard risks.

In Group II the majority were accepted as substandard risks.

In Group III practically all were accepted as highly substandard risks.

When we consider the favorable mortality experienced in Group I, we must arrive at the conclusion that this group included a good many cases that might be considered as functional, orthostatic or benign albuminuria.

N. J. Burden[6] has reported his analysis of 56 cases of persistent functional albuminuria in otherwise healthy male students and was able to find nothing in the past medical histories or in the physical examination to account for the urinary abnormality. Kidney function tests by the phenolsulphonephthalein and Mosenthal tests were normal in all individuals. He did find, however, that the incidence of cardiovascular-renal disease in the parents of students with albuminuria was twice as frequent as in the parents of students showing no such abnormality.

In addition to the older theories in regard to the causation of functional or orthostatic albuminuria, Thomas[7] and his coworkers have advanced an interesting theory of the passage of proteins from the kidney. They point out that formerly we believed that the kidney, as a result of inflammatory or degenerative changes, became incapable of excreting water, soluble minerals and metabolites, and of retaining within the circulation the proteins of the blood and that the clinical aspect of nephritis was due to the action of these retained substances. They now believe that the kidneys, either normal or diseased, possess a vital and selective activity toward protein that allows them to excrete all foreign protein, that is, all protein that is not normal to the circulation of that particular animal, while retaining those proteins which belong in the blood stream. Thus, blood or serum albumin from another series, such as egg, will be promptly excreted even when the kidney is diseased. Their theory is that the normal serum albumins may become altered by some dyscrasia of metabolism and are therefore excreted. This has been shown to be so by the simple introduction of sodium chloride into the circulation of dogs, which destroys the normal electrolytic equilibrium; cell membranes are broken and protein is released from

the intercellular spaces, notably the liver, which passes into the circulation and is then excreted by the kidney as a foreign protein. While this theory is not entirely accepted by others, notably Hayman and Bender,[8] it does afford a working hypothesis that explains the favorable mortality in this group, for if we accept this theory it is on the basis that the kidney is not damaged but that the albuminuria is more an expression of faulty metabolism.

As Group II included cases of albuminuria, plus histories of nephritis, casts, hematuria, etc., it represents a group that may be considered to have more or less kidney damage or impaired renal function, and this we see reflected by a mortality experience of 139% of the expected. The mortality for ages under 40 was distinctly higher than for age 40 and over and is summarized in the following table:

| Ages at Issue | Actual Deaths | Expected Deaths by Co. Standard | Ratio of Actual to Expected |
|---|---|---|---|
| Under 40 | 62 | 26.5 | 234% |
| 40 and over | 38 | 45.2 | 84% |
| All | 100 | 71.7 | 139% |

This rather striking difference may be explained by the idea that the impairments of the younger entrants represented more the acute phase of genito-urinary disease, with its quick termination, while those of the older a more chronic form with a delayed result. The effect of selection is also represented in this group, as it was apparent by the review of the files that at the older ages there was considerably more care exercised.

As Group III represented the cardiovascular-renal syndrome, we naturally expected an excessive mortality but it is interesting to compare the mortality (312%) with the mortality of Group III of Dr. Bolt's[9] paper of 1934, "Hypertension as an Underwriting Problem", which group included cases where increased blood pressure was not the only impairment but where at some time in the past or on examination at issue some other significant

impairment was reported. The results of the mortality studies of these two groups indicates that in this type of risk we cannot expect a mortality experience better than 300% of the expected. In Group III the mortality ratio was practically the same in each of five groups of ages at entry.

For purposes of comparison, cerebral hemorrhage, apoplexy, organic disease of the heart, nephritis, Bright's disease, endocarditis, myocarditis, angine pectoris, disease of the arteries, embolism and thrombosis, causes of death, in the Basic Table 1920-1926, were considered to be deaths due to cardiovascular-renal disease. The death rate from these causes was significantly high in all three groups, being twice the normal in Group I, 3½ times the normal in Group II and 8 times the normal in Group III.

I wish here to acknowledge assistance given me by my colleagues of the Medical Board; by Dr. Arthur Hunter, Mr. Bowerman and Mr. Schwartz of our Actuarial Department.

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Dr. Wells—Dr. William M. Bradshaw, Medical Director of the Mutual Life Insurance Company will open the discussion of this paper.

Dr. Bradshaw—Dr. Evers' paper "The Significance of Albuminuria" is timely particularly for two reasons. First, because

selection in this group has always been difficult and, I might say, haphazard due to a lack of definite statistical information, and secondly, clinical information on this subject has been, until recently, meagre and unconvincing.

Just as the presence of a heart murmur was formerly regarded as indicative of heart disease, so the presence of protein in the urine was regarded as indicative of nephritis. Only in the past few years have text-books divided albuminuria into two general classes—functional or benign and organic or pathological.

McCrae[1] in the 1935 revision of Osler's Text-Book of Medicine divides albuminuria into cases "without coarse renal changes" and cases "in which there are evident anatomical changes." I think we will agree that it is only the group "without coarse renal changes" that should be considered for insurance selection.

Functional albuminuria must be fairly prevalent. Hugh MacLean[2] in a study of 60,000 apparently healthy recruits found an incidence of albumin in five per cent. in early morning specimens. In this same group, albumin was demonstrated in from seven to fourteen per cent. after exercise and this effect after exercise in certain individuals has been repeatedly demonstrated by other observers. Orthostatic albuminuria, drugs causing marked vasoconstriction, shock, febrile illnesses and a large group of sensitive persons in whom small amounts of a specific protein will induce albuminuria of allergic origin, are some of the commonest conditions which may be included in the group of functional albuminurias.

It should be remembered that proteinuria represents a loss of substances essential to the body and if prolonged, results ultimately in one of the degenerative forms of kidney lesions. McDonald[3] states that the total amount of albumin in the blood of an adult weighing 150 pounds averages 140 grams. A loss of ten

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2. MacLean, Hugh, Albuminuria and War Nephritis Among British Troops in France. Report to the Medical Research Council November 3, 1919.

3. McDonald, R. H., The Clinical Significance of Albuminuria. Medical Clinics of North America, January, 1934.

to twenty grams daily, as is possible in cases excreting large amounts of albumin, would soon result in a serious disturbance to the organism as a whole. It is well to keep this point in mind in the selection of the orthostatic albuminurias as a small percentage of the group showing this abnormality excrete larger and larger amounts of albumin as the day advances.

The experience of the Mutual Life in these cases with albumin conforms closely to that of the New York Life as presented by Dr. Evers. The period covered in the Mutual's investigation is the same as that of the New York Life, namely, issues of 1925 to 1933, exposed to 1934 anniversaries. Ratios of actual to the expected losses likewise have been calculated by the same mortality table.

Unfortunately, no subdivision was made into those groups used by Dr. Evers, i.e., albumin alone, albumin with another impairment of the genito-urinary system and albumin with a significant impairment of some other system. As all of the Mutual's applicants were accepted at standard rates, it is most probable that our cases would fall chiefly in Dr. Evers' Group I, with a few cases in Group II.

By combining Groups I and II of the New York Life's experience, the mortality ratio is 115%. The mortality ratio of the Mutual's experience is 127%. Both of these ratios are based on Policies. On the Amount Basis the mortality ratio of the Mutual's experience is slightly less than on Policies, namely, 122%.

All of the Mutual's applicants showed a trace of albumin on examination, while the experience of the New York Life includes those where a history of albumin was given in addition to those where albumin occurred in the physical findings.

Subdivided into ages at entry, the Mutual's experience does not show the same characteristics as the New York Life's. Ages under 40 have a mortality ratio of 118% and ages 40 and over 131%. I am at a loss to explain this discrepancy except that our selection is strict in cases showing more than a single impairment.

It is interesting to note that among the causes of death, there was an increase of 1½ times the normal in cardiorenal-vascular disease.

Dr. Evers reference to the increased incidence of cardiorenal-vascular disease in the parents of a group of students with albuminuria (twice as frequent as in the normal group) is very interesting and is a suggestion for an important piece of research by some member of this association.

Finally the mortality of Dr. Evers' Group III, 300% or over, indicates the necessity of a very careful study of applicants presenting this impairment in order to rule out what he terms the cardiovascular-renal syndrome. To accomplish careful selection in this Group means not only a complete history and physical examination but the inclusion of laboratory tests, at times more extensive than a routine urinalysis, and a careful and accurate recording of the family history.

By this method of excluding evidence of organic disease of the kidney we can finally assure ourselves that we are dealing with a true case of functional albuminuria.

Dr. Wells—Dr. Daniel M. Shewbrooks, Assistant Medical Director of The Penn Mutual Life Insurance Company will continue the discussion.

Dr. Shewbrooks—Dr. Wells and Members: Dr. Evers, in his excellent study, presents a new approach to our daily problem of albuminuria. His explanation for the unexpected increase in mortality of the group with a constant trace of albumin (substandard) and of the group with large amounts of albumin either intermittent or constant (substandard) is thought-provoking, and particularly so in the consideration of the practicability of these findings to selection procedures.

One might re-state the problem briefly as follows—"If it is possible to obtain satisfactory mortality from standard material in two homogeneous groups with a given amount of albumin, and the same amount of albumin in two other homogeneous groups (substandard) produces unfavorable mortality, it follows that factors other than the albumin contribute to the unfavorable mortality."

QUESTION

(1) What influence has albumin of itself upon mortality?
(2) What are the other determining factors?
(3) To what extent do these factors, combined with albumin, affect mortality?
(4) Do the new findings warrant a change in our present practice for the underwriting of this class of risk?
(5) How may these findings be applied in a practical manner to selection?

The results of the mortality investigations of the New York Life Insurance Company's material in the three groups studied afford an answer to some of these considerations and, at the same time, furnish the selector with a broader basis for his opinion as to the advisability of the acceptance of this class of risk.

In connection with the exhibit of mortality for these three groups in relation to the Company's standard for issue from 1925 to 1933 (carried to the anniversary in 1934), it would be interesting for the sake of comparison to have the results in relation to the actual ratings imposed, even though these ratings may have been based upon a conception of the relative importance of albuminuria which is entirely different from that now held. It would be equally interesting to have the mortality ratios for age groups under 40 and over in Group I and to compare them with those of the Medical Impairment Group and of Group II of the present study. In the former, the mortality ratios were distinctly higher at the later than the earlier durations; and with regard to age at entry, the mortality was highest in the age group 40-49. In Group II, the mortality for ages under 40 was considerably higher than for 40 and over (234% under age 40; 84% at 40 and over; 139% combined mortality). Would the mortality under Group II for these ages, given a larger and longer exposure, approach or approximate the mortality for the age group 40-49 as shown in the Medical Impairment Study?

The essayist points out that deaths in Group I from cardio-vascular-renal diseases were twice the normal, three and one-half times the normal in Group II, and eight times the normal in

Group III, indicating rather forcibly the relationship which frequently exists, but not always possible of proof in life insurance medicine, between the impairment albuminuria and the cardiovascular-renal diseases.

The investigation covers an exposure of but nine years and, therefore, is open to the possible objection that it does not represent the ultimate mortality. Can it be safely assumed that, with considerably more material spread over a longer period, the exposure will not be materially different from that of these first nine years? In other words, if in addition to the present findings this study had shown that past methods of selection had produced satisfactory mortality, should we not be warranted in continuing their use with some equanimity until such time as further and more complete data furnished the means of adopting these new findings with greater assurance? If, on the other hand, the study had shown that past selection produced an unfavorable mortality in the aggregate, could we not conclude that we required less complete proof of the reliability of these findings before incorporating them into our present practice?

In many companies, it is the practice to accept on a standard basis cases showing albumin in small amounts where there is no evidence of nephritis, especially at the younger ages. If we should avail ourselves of the findings in Group I (indicating a mortality of 94%), at once the scope of the selector's action on a standard basis is greatly broadened. While this would be true especially at the younger ages; yet on the other hand, on the strength of this new statistical evidence, a reasonable liberality of acceptance on a like basis would seem to be warranted at the older ages when supported by knowledge of the kidney function.

If one studies the determining factors comprising Groups II and III, he is impressed with some of the problems that would confront the selector. While these are common to selection in general, yet in the consideration of risks under the new classification they appear to warrant added emphasis. I shall mention only a few.

One notes the outstanding emphasis, and rightfully so, that is placed upon history; viz., (1) unfavorable medical history, (2) the past adverse urinary findings, (3) unfavorable history admitted at time of examination (developed through the skill of the examiner), and finally (4) adverse findings at the time of acceptance (presumably the result of home office investigations). What practical limitations should be placed upon the investigation of these several sources? When and to what extent can requests for statements from attending physicians be justified? Will this class of risk warrant a higher percentage of such statements than formerly? What, if any, tests other than present routine laboratory studies will be justified, remembering the while that neither frequency nor quantity of albumin is a determining factor? What of the proper interpretation of the laboratory findings? Can selection within these groups be successfully accomplished and a reasonable mortality obtained other than by a careful study of all the component factors by well-trained medical officers?

There is no doubt but that more stress would need be placed upon knowledge of the source of this class of business and the circumstances under which it was submitted, also upon the selector's being thoroughly conversant with the abilities of the examining physician. First and last, the major responsibility for complete, careful personal histories must rest upon the examining physician. More emphasis could well be placed upon the selector's knowledge of the examiner's ability and understanding of company practice, his skill in developing pertinent details of the history, and finally knowledge of the thoroughness and accuracy of his physical and laboratory findings.

As applied to my own work, acceptance of risks under this new classification would be limited to the first two groups. In Group II, the selector would be confronted with a mortality of 234% under age 40, 84% at 40 and over, and for the group as a whole of 139%. This would call for considerably more care in selection at the younger ages and permit greater liberality at the older ages. If the high mortality for the younger entrants in this group represents the acute phase of genito-urinary disease, with its quick termination, a longer period of postponement following

an acute genito-urinary infection than was formerly required would seem to be warranted (postponement at least until such time as further study would indicate permanent cure or that the disease had passed into a chronic stage). This would apply equally for ages over 40.

Group II comprises risks considered to have more or less kidney damage or impaired renal function, the early determination of which is most important from an underwriting standpoint, especially at the older ages and with large amounts at risk. But from a practical standpoint, how far should the selector go in determining the degree of damage to the renal function? Should he limit himself to history plus home office laboratory studies, or would he be warranted in requiring more extensive clinical and laboratory investigations? The present investigation disregards the frequency of occurrence and the amount of albumin present. In the light of this new conception of the problem, therefore, the selector would no longer rely upon these two factors in his estimation of renal function, for, as the essayist points out, neither of them, especially in casual specimens such as we are forced to accept in life insurance medicine, can be considered as a true index of either the functional capacity of the kidney or the extent of damage present in the kidney, if there be any damage. There is also to be kept in mind the well-known fact that marked cases of nephritis may have a very faint trace of albumin one day and, on the next, a large amount or none at all.

It has been shown experimentally on animals that, with the removal of almost two-thirds of the kidney substance, the remainder is still able to excrete all the waste substances from the blood. This tremendous margin of safety only increases the practical difficulty of early determination of renal damage, so important for our purposes of classification. Even if capable of application from a life insurance standpoint, the various renal function tests are not conclusive in the early stages of renal damage. By the time they are, the diagnosis of renal damage is usually already apparent. In contrast, we have but to recall the reliability of the blood sugar tolerance test for the early determination of impaired

sugar tolerance, and the electrocardiogram and x-ray for early cardiac impairment. It would, therefore, appear to the writer that, for the present at least, selection of risks on the basis of this new study would necessarily have to rest upon the history of each individual case as developed through the several sources previously mentioned, reliance upon our present laboratory technique, a corps of skilled examiners thoroughly conversant with Company practice and, finally, selection at the home office of applicants in these groups by experienced medical officers.

Dr. Evers' paper is of unusual interest, and I know we all hope that at some future meeting he will give us the results of his further studies.

DR. WELLS—Dr. Evers, have you anything to say in closing?

DR. EVERS—I wish to thank Dr. Bradshaw and Dr. Shewbrooks for their discussion of my paper. Dr. Bradshaw gives results as to ages of entry in his material relating to albumin, comparing it with the results of my Group Two, in which there was a great variation between the mortality experience under age 40 and over age 40. I am rather of the opinion that this material is not comparable to the material in my Group Two. Inasmuch as nearly all the cases included in my Group Two were accepted as substandard risks I think that his material compares more with the data included in my Group One.

Dr. Shewbrooks asks a great many questions, and rightfully so, and I feel that the answer to these questions is more the problem of the individual selector in each company. There are two points, however, that I wish to mention. He asks as to the mortality in Group One under age 40 and over age 40. While I do not have the actual figures here, there was no significant variation as to the ages of entry in this Group One. In other words, they were about equally divided as to mortality.

Dr. Shewbrooks states "The investigation covers an exposure of but nine years, and therefore is open to the possible objection that it does not represent the ultimate mortality". In order to have some guide as to what the mortality would be after the tenth year I consulted the detailed tables of the M.I.S. study in

connection with three impairments, and they indicate that we can expect about the same mortality from the 11th to the 19th year.

In three impairments in which the number of deaths were fairly significant the results were as follows: Albumin, intermittent, trace found on examination (substandard). From the 6th to the 10th year the actual deaths were 55, the expected deaths 44.79, giving a ratio of actual to expected of 123 per cent. In the duration from the 11th to 19th years, there were 18 actual deaths, and expected deaths of 16.06, giving a ratio of 112 per cent. We see in this group a slight downward trend in the mortality after the 10th year.

Albumin, constant, trace found on examination (substandard). Years 6 to 10, actual deaths 144, expected deaths 79.95, giving a mortality ratio of 180 per cent. Years 11 to 19, actual deaths, 54, expected 29.20, giving a mortality ratio of 185 per cent., practically the same.

Albumin, constant, moderate, found on examination (substandard). Sixth to 10th year, actual deaths 53, expected 29.68, a ratio of actual to expected of 179 per cent. Eleventh to 19th year, actual deaths 25, expected 12.75, a ratio of actual to expected of 196 per cent. In this group we see a slightly upward trend in the mortality ratio, but not to a degree that we might expect a considerable extra increase in mortality after the 10th year.

DR. WELLS—Our next paper is entitled "The Selection of Risks with a History of Gastric or Duodenal Ulcer", and will be presented by Dr. Louis I. Dublin, Third Vice President and Statistician of the Metropolitan Life Insurance Company. Although Dr. Dublin is not a member of this Association he needs no introduction to this audience. Even if it were not for the fact that he had appeared on our program on several previous occasions we would still recall with interest the splendid statistical bulletins on public health questions which frequently appear in print over his signature. Associated with Dr. Dublin in the preparation of this paper were Dr. Albert O. Jimenis, Assistant Medical Director, and Mr. Herbert H. Marks, a member of the Statistical Bureau of the Metropolitan.

# THE SELECTION OF RISKS WITH A HISTORY OF GASTRIC OR DUODENAL ULCER

By Louis I. Dublin, Ph. D., Third Vice President and Statistician, Albert O. Jimenís, M. D., Assistant Medical Director, and Herbert H. Marks,

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## I

Applicants for life insurance with a history of duodenal or gastric ulcer deserve all the statistical study we can give them; for, there is a great deal to be learned regarding these cases and their prognosis from the records available in the companies. Their study is seriously impaired by the fog that obscures the diagnosis, and even where the diagnosis is correct, the applicant for insurance often does not know or does not understand the facts about his case, consequently giving serious misstatements on the application. Because of these difficulties, we were as careful as we could be and personally reviewed practically all of the histories included in this study. But faulty as is the material, it has justified the effort of such analysis as we have made.

It will help in the consideration and interpretation of our material if we review the important facts on the incidence and results of treatment in clinical and surgical practice. First, in regard to site, ulcers of the duodenum are far more common than ulcers of the stomach. A few representative experiences[1-14], which we have reviewed, show from one and one-half to five times as many duodenal ulcers as gastric. In the aggregate, the ratio was approximately three to one.

Males are far more frequently affected than females[1, 3, 15-16]. In general, the frequency of the disease is two to three times as great in men as in women. The difference in the sex ratios is especially large in the case of duodenal ulcers. Among young adults, between 20 and 30, acute gastric ulcers are equally com-

mon in the two sexes[17]. But at the later ages, where chronic ulcers are more common, men are the more frequent sufferers.

The results of treatment of peptic ulcer, as reported by clinicians and surgeons, are extremely difficult to assess and compare. There is in the first place no agreement between the various observers as to what constitutes a satisfactory result. The length of the period covered by the follow-up differs. A really serious defect in many of these studies is the large percentage of cases which are not traced. The proportion of such cases is often large enough to render doubtful the conclusions drawn from the figures. The results are rarely measurable by actuarial or statistical methods to determine whether or not the mortality is excessive. There are, furthermore, differences in the types of cases seen by different observers and in the selection of cases for surgery. These factors are bound to affect the results. For these reasons, it is most inadvisable to combine the figures for several clinics.

Let us briefly review, however, a few recent typical experiences from the extensive literature on the subject. Morton,[14] in a series of medically treated cases seen over an eleven year period, and followed for two years or more, reported 44.0 per cent. excellent or good results in 25 gastric ulcers and an almost identical figure, 43.6 per cent. in 85 duodenal ulcers. The subsequent mortality was, however, greater in the gastric group. An appreciable number reported subsequent operative treatment. In a smaller series of surgical cases, the percentages of favorable results were much higher.

Brown,[3] in an extensive series of medically treated cases seen during a period of 16 years and followed for at least two and one-half years, reported 66.2 per cent. excellent or good results. His report does not, however, distinguish the site of the ulcer. Subsequent surgical intervention occurred in 14 per cent.

Jordan and Kiefer[18] reported 81.2 per cent. successes in medically treated duodenal ulcers at the end of two years, but their observations, extending over a longer period, showed that this percentage declined rapidly. In cases followed for five years, only 54 per cent. had no recurrence.

Fremont-Smith and McIver,[9] reporting a large series of surgical cases, found a high proportion symptom-free after operation, even after ten years had elapsed. In the aggregate, their cases, observed over a five-year period and traced for at least two years, showed 77.5 per cent. symptom-free among the gastric cases and 75.5 per cent. in the duodenal cases. The percentage of favorable results did not differ markedly either in the duodenal or gastric cases as the interval since operation increased. Recurrences occurred in 11 per cent. of the patients in this series.

Of 600 gastroenterostomies in Balfour's[1] series operated during 1918-1919 and traced for five years or more, the percentage of excellent or good results was 79 per cent. in the gastric group and 69 in the duodenal group. The subsequent mortality, however, was much higher among gastric cases.

In general, the histories subsequent to the original observation show a relatively high percentage of cancer of the stomach in the gastric cases, whether medical or surgical. This is not true, however, of the duodenal ulcers among whom recurrent ulcer is a frequent problem.

The attitude of insurance medical directors towards applicants with a history of peptic ulcer has been, to a large extent, determined by the results of clinical studies. These applicants have been granted insurance for many years, but at the beginning they were picked with extreme care and for a long time few were granted standard insurance. The first rational basis for rating these risks was the analysis by Arthur Hunter[19] of the experience with surgical cases of the Mayo Clinic, operated on during 1906-1915 and traced to the anniversary of operation in 1916. This report, presented before the Association at its 1918 meeting, was based on 2,263 patients surviving the operation and who were traced. The results were analyzed according to the site of the ulcer, the mortality standard being the death rates of the United States Life Table for 1910. It was found that the mortality of those with duodenal ulcer (1,651 cases) was only 91 per cent. of that standard. The mortality fluctuated considerably according to the time elapsed since operation, but it was somewhat below the average after the fifth year. Those operated upon for

gastric ulcer had a mortality two and three-quarter times the standard. It was extremely high during the first two years subsequent to operation. The ratios in later years were distinctly lower, but the number of cases was too small to yield reliable results. Unfortunately, no data were available as to the causes of death.

Alvarez,[20] in his paper before the Medical Section of the American Life Convention in 1929, gave a very thorough and critical summary of the medical literature on the prognosis of ulcer, as well as the results of his searching analysis of the experience at the Mayo Clinic. He stressed the frequency of recurrence, and emphasized the necessity of distinguishing between duodenal and gastric ulcers. He also pointed out the long duration of symptoms in gastric ulcer, compared to the relatively short duration in gastric cancer. His recommendations on insuring applicants with a history of peptic ulcer were even more severe than the practice of most life insurance companies.

The first insurance experience published was that of the Prudential, in Dr. Ill's[21] discussion of Dr. Finney's paper at the 1929 meeting of this Association. The experience was analyzed according to the site of operation and treatment. In the surgical group, the mortality was 130 per cent. of the expected. The gastric ulcer cases far outnumbered the duodenal, the ratio being three to one. The mortality of the two groups was the same. In medical cases, the mortality was, in the aggregate, lower than in the surgical cases, but was higher in the gastric group than in the duodenal. In both medical and surgical cases, those accepted for insurance within a few years of illness showed a higher mortality than those accepted after a longer interval. All these differences, however, were not very reliable because the number of deaths was small, and although the causes were analyzed, not much could be learned from them for the same reason.

At the same meeting, Dr. Cragin[22] reported on the experience of the Aetna within the five years preceding, but not a single death had occurred in his relatively limited experience.

The first extensive insurance study of peptic ulcers was the analysis of the combined experiences of the companies in the

Medical Impairment Study[23]. The results were not altogether as had been anticipated. The Medical Impairment Study showed that we could not rely on the applicant's statements to determine the site of the ulcer. For, in *surgical* cases, the amount of experience on duodenal ulcer was slightly less than that on gastric ulcer, and in *medically* treated cases was distinctly smaller than that on gastric ulcer, despite the more stringent selection of the latter. The mortality results were rather mixed. The mortality of substandard *surgical* gastric cases was higher than that of the corresponding duodenal group, but, in the small standard experiences, gastric cases gave a somewhat, though not significantly, lower mortality than the duodenal cases. In both ulcer groups, cases accepted within a few years of operation gave higher ratios than those accepted after a greater interval, but in the duodenal cases there was practically no difference between those accepted from three to five years after operation and those accepted from six to ten years after operation.

In the *medically* treated cases, the small experience on gastrics, accepted for standard, was relatively good, and the substandard experience was much worse, although not as bad as the *surgical* gastric cases. *Medically* treated duodenal cases gave approximately the same results as the gastric cases. The small experience on those accepted within two years of application was very bad. The mortality results on *medically* treated duodenal cases were not significantly different from that on the *surgical* cases. Analysis of the causes of death showed very high death rates from cancer, particularly among those operated upon for gastric ulcer. In the medically treated gastric ulcer group, a very high mortality was reported from recurrent ulcer.

## II

The present paper offers the experience of the Metropolitan Life Insurance Company on peptic ulcer risks accepted for insurance, during the years 1912 to 1932 and traced to the anniversary in 1934. As a study of a single company's experience, it has certain advantages, namely, a fairly consistent policy in the handling of these cases and the opportunity for critical review of the original records.

On the other hand, there is the disadvantage of relatively small numbers. Our study, therefore, cannot be conclusive in all respects, but it does indicate the direction which joint investigations of this material may take in the future.

The classification of these cases has not been easy. As we stated last year in connection with gall bladder histories,[24] there can be little doubt but that a number of these ulcer diagnoses, especially the medical group, covered all sorts of conditions that may exist in the upper abdomen. In the surgical cases, we have accepted the ulcer histories as stated, except where there was sufficient cause to render the statement very dubious. Medically treated cases present very real difficulties in selection and classification. In all of our cases the applicant stated that he had had an ulcer. A few of these cases, however, were discarded because the details of his illness, as reported by the applicant, made the diagnosis untenable. The rest were classified as *ulcer* or *suspected ulcer*. In the former group, we have put all cases where the treatment was continuous for six weeks or more, or, regardless of duration, where the condition was recurrent or accompanied by hemorrhage. In the suspected group, we have put those cases where the duration of illness was less than six weeks, the condition was not recurrent and not accompanied by hemorrhage. We have disregarded the site of the ulcer in *medically* treated cases, because we were unwilling generally to trust the statement of such diagnoses. As in previous studies, we have excluded all cases which were substandard for other reasons, either medical or occupational. We have also excluded those in which *post*-operative complications were reported or in which additional major surgery other than appendectomy was simultaneously performed. The experience was limited to white persons.

Our experience is on 3,135 risks with a history of peptic ulcer. Of this number, 1,905 were *surgical* cases and the remaining 1,230 were *medical*. In the *surgical* group, 1,635 reported no complications, but 270 gave a pre-operative history of perforation, hemorrhage, or both. The stomach was reported to be the site of the ulcer in over two-thirds of the *surgical* cases. In one-fourth, the site was the duodenum and in the remaining 5 per cent., the site

was not given. Thus we have nearly three times as many gastric as duodenal ulcers. This is so contrary to clinical experience that it immediately casts doubt on the site of the ulcer as reported. In the *medically* treated group, 1,147 reported no complication, and 83 gave a history of hemorrhage. Of the uncomplicated cases, 630 were *ulcer* and 517, *suspected ulcer,* according to the classification previously described.

The great majority of these risks with a history of peptic ulcer were males, in line with clinical experience. Of the 1,905 *surgical*

TABLE 1.

**Type of Treatment and Location of Ulcer in Surgical Cases Among 3,135 Risks with a History of Peptic Ulcer. By Sex. Metropolitan Life Insurance Company, 1912-1932.**

| | Number of Cases | | |
|---|---|---|---|
| | Both Sexes | Male | Female |
| Total Cases | 3,135 | 2,792 | 343 |
| **Surgical** | | | |
| Total | 1,905 | 1,748 | 157 |
| Uncomplicated | 1,635 | 1,480 | 155 |
| Gastric | 1,162 | 1,057 | 105 |
| Duodenal | 378 | 342 | 36 |
| Not specified | 95 | 81 | 14 |
| Complicated | 270 | 268 | 2 |
| Perforation | 241 | 239 | 2 |
| Hemorrhage | 29 | 29 | -- |
| Gastric | 172 | 170 | 2 |
| Duodenal | 90 | 90 | -- |
| Not specified | 8 | 8 | -- |
| **Medical** | | | |
| Total | 1,230 | 1,044 | 186 |
| Uncomplicated | 1,147 | 972 | 175 |
| Ulcer | 630 | 528 | 102 |
| Suspected ulcer | 517 | 444 | 73 |
| Hemorrhage | 83 | 72 | 11 |

cases, 1,748 were males and 157 females. Females constituted 8 per cent. of these *surgical* ulcer cases, therefore, as compared with approximately 15 per cent. of the inforce in our Ordinary Department during the period under observation. This would indicate a frequency of peptic ulcer in males approximately twice that of females. Very striking was the rarity of pre-operative complications among women with *surgical* peptic ulcers, only 2 out of the 157 in this experience. In the *medical* cases, approximately 85 per cent. were males and 15 per cent., females, or, roughly, the same proportions, according to sex, of the inforce in our Ordinary Department. The number of cases, classified by method of treatment and, in the *surgical* cases, by site, are shown for each sex, in Table 1.

Several other characteristics of this group are of interest. In regard to age, very few cases were less than 20 at issue, 18 per cent. were between 20 and 29, 45 per cent. were between 30 and 39, 28 per cent. were between 40 and 49, and 8 per cent. were 50 or over. The medical cases were, on the average, somewhat younger than the surgical cases. Thus, 23 per cent. of the former were under 30, compared with 16 per cent. of the surgical group.

As a group, these ulcer cases tended to be underweight, though this was not extremely marked. The preponderance of underweights was more noticeable in the surgical group.

No consideration was given to the number or frequency of attacks, because the details of illness were not dependable enough to warrant such distinction and because recurrences are so common, particularly in those cases coming to operation.

In large degree, these risks were limited to substandard insurance. Such cases comprised five-sixths of the total, both in the surgical and medical groups. Over half of them were, indeed, limited to our Special Class groups, which provide for a mortality 60 to 150 per cent. above standard.

We have studied these cases in relation to the several factors which might be expected to affect the mortality, namely, the sex and age of the applicant, the type of treatment, the site of the ulcer (surgical cases only), the presence or absence of complica-

tions, the interval between the illness or operation and the application for insurance, and the build of the applicant. We have investigated the surgical cases to see what effect technical skill and improvement in surgical technique had on the results. We have also studied and analyzed the causes of death.

We have combined standard and substandard cases on the assumption that they would tend to separate out in the analysis of the various factors. The mortality has been measured on the Basic Mortality Table, 1909-1927, which was the most suitable.

## III

## MORTALITY

### SURGICAL CASES

The 1,905 risks with a history of surgical peptic ulcer yielded a total of 10,017 years of life, an average of 5.3 insured years. There were 96 deaths, or 172.0 per cent. of the expected on the Basic Table. The ratios of actual to expected deaths were almost identical in the first five and in the sixth and later years after issue. The mortality ratio of risks under 40 years of age at issue, 182.0 per cent., was somewhat higher than for those 40 and over, 164.6 per cent. This advantage of the older risks was, however, limited to the first five insurance years. In the sixth and later years, the ratios were much the same in these broad age groups.

### MORTALITY BY SEX

In the aggregate, the mortality of females has been somewhat, though not significantly better than that of males, the ratios being 152.2 per cent. and 173.8 per cent. respectively. Among males, as Table 2 shows, the mortality ratios at ages under and over 40 at issue were practically alike. The younger female *surgical* risks did rather poorly and were responsible for the slight excess, at the younger ages, recorded for the combined experience. The differences recorded between the two sexes may be simple chance differences, due to the small sample of female lives. Because the aggregate experiences of the two sexes are fairly similar, they have been grouped together in subsequent analyses.

TABLE 2.

**Mortality of Risks with a History of *Surgical Treatment* for Peptic Ulcer. Ratio of Actual to Expected Deaths by the Basic Mortality Table, 1909-1927. By Sex and by Broad Age Groups at Issue.**

| Sex<br>Ages at Issue | Years of life exposed to risk | Deaths | Per cent. Actual of Expected Deaths | | |
|---|---|---|---|---|---|
| | | | Aggregate | First five insurance years | Sixth and later insurance years |
| Total | | | | | |
| All ages | 10017.26 | 96 | 172.0 | 170.5 | 173.8 |
| Under 40 | 6214.16 | 43 | 182.0 | 185.9 | 177.4 |
| 40 and over | 3803.10 | 53 | 164.6 | 159.6 | 171.1 |
| Males | | | | | |
| All Ages | 9156.78 | 89 | 173.8 | 172.0 | 176.0 |
| Under 40 | 5638.18 | 37 | 171.7 | 177.8 | 164.3 |
| 40 and over | 3518.60 | 52 | 175.3 | 167.9 | 184.8 |
| Females | | | | | |
| All Ages | 860.48 | 7 | 152.2 | * | * |
| Under 40 | 575.98 | 6 | 291.3 | * | * |
| 40 and over | 284.50 | 1 | * | * | * |

*Ratio not significant because of small number of deaths.

### MORTALITY IN RELATION TO PRESENCE OR ABSENCE OF COMPLICATIONS

Risks who reported a history of operation for peptic ulcer with no complications (186 had simultaneous appendectomy) comprised the bulk of the surgical group. They yielded an experience of 8,808 years of life. There were 84 deaths, or 168.0 per cent. of the expected by the Basic Mortality Table. There were no significant differences in mortality by age or by duration of insurance. On the 270 cases reporting pre-operative perforation or hemorrhage, or both, there were 1,209 years of life with 12 deaths, or 206.2 per cent. of the expected. The higher mortality in this group, as compared with the uncomplicated cases is in line with expectations, although the excess is statistically not too sig-

nificant. Because of the small experience on this group, the divergencies, by age and duration of insurance, are not reliable.

Removal of the appendix in the course of abdominal surgery for other causes is common, especially where the appendix shows signs of infection, or is suspect. The mortality of 186 such cases (excluding those reporting perforation or hemorrhage) was found to be appreciably better than the surgical group as a whole. It may be that this group is in a sense more select than the run of cases in that they were in good enough condition at operation to permit the double surgery, but the experience is too small to make a definite statement. In some of these cases, moreover,

TABLE 3.

**Mortality of Risks with a History of *Surgical Treatment* for Peptic Ulcer With and Without Pre-operative Complications. Ratio of Actual to Expected Deaths by the Basic Mortality Table, 1909-1927. By Broad Age Groups at Issue.**

| Ages at Issue | Years of life exposed to risk | Deaths | Per cent. Actual of Expected Deaths | | |
|---|---|---|---|---|---|
| | | | Aggregate | First five insurance years | Sixth and later insurance years |
| Uncomplicated Cases (Incl. Simultaneous Appendectomy) | | | | | |
| All Ages | 8808.21 | 84 | 168.0 | 171.2 | 164.1 |
| Under 40 | 5386.63 | 36 | 174.2 | 171.5 | 177.5 |
| 40 and over | 3421.58 | 48 | 163.6 | 171.0 | 154.2 |
| Simultaneous Appendectomy | | | | | |
| All Ages | 975.61 | 6 | 126.3 | * | * |
| Cases Complicated by Perforation or Hemorrhage | | | | | |
| All Ages | 1209.02 | 12 | 206.2 | 165.3 | 274.0 |
| Under 40 | 827.50 | 7 | 236.5 | 273.2 | * |
| 40 and over | 381.52 | 5 | 174.8 | * | * |

*Ratio not significant because of small number of deaths.

there is the possibility that the primary condition was appendicitis and no ulcer was present, despite the applicant's statement.

### MORTALITY ACCORDING TO SITE, UNCOMPLICATED CASES

*Surgical* cases which reported ulcer in the stomach gave a mortality barely higher than those reporting ulcer in the duodenum. This finding is in contradiction to clinical experience. We have already stated reasons for suspecting that many of these cases are inaccurately labelled as to site and this finding confirms our suspicion. We have, therefore, grouped all our surgical cases together simply as peptic ulcer in our further discussion.

TABLE 4.

**Mortality of Risks with a History of *Surgical Treatment* for Peptic Ulcer According to Reported Site of Ulcer. Ratio of Actual to Expected Deaths by the Basic Mortality Table, 1909-1927. Uncomplicated Cases Only. By Broad Age Groups at Issue.**

| Site<br>Ages at Issue | Years of life exposed to risk | Deaths | Per cent. Actual of Expected Deaths | | |
|---|---|---|---|---|---|
| | | | Aggregate | First five insurance years | Sixth and later insurance years |
| Stomach | | | | | |
| All Ages | 6348.35 | 65 | 176.7 | 191.8 | 159.0 |
| Under 40 | 3885.68 | 30 | 198.7 | 242.0 | 151.7 |
| 40 and over | 2462.67 | 35 | 161.4 | 158.9 | 164.4 |
| Duodenum | | | | | |
| All Ages | 1932.00 | 17 | 162.4 | 113.6 | 232.0 |
| Under 40 | 1164.76 | 6 | 137.3 | .. | 333.3 |
| 40 and over | 767.24 | 11 | 180.3 | 195.0 | * |
| Site Not Specified | 527.86 | 2 | * | * | .. |

*Ratio not significant because of small number of deaths.

### MEDICAL CASES

The 1,230 *unoperated* cases yielded an experience of 6,081 years of life, an average of 4.9 years per case. There were 44 deaths,

or 134.8 per cent. of the expected on the Basic Table. The mortality ratios were a little higher in the first five years after issue than in the sixth and later years, but there has been little difference in mortality between the younger and the older risks.

The experience on females has been too small to yield a reliable comparison according to sex; but thus far, the mortality in the small group of females with a history of *medical* treatment for peptic ulcer has been better than that for males.

TABLE 5.

**Mortality of Risks with a History of *Medical Treatment* for Peptic Ulcer. Ratio of Actual to Expected Deaths by the Basic Mortality Table, 1909-1927. By Sex and by Broad Age Groups at Issue.**

| Sex<br>Ages at Issue | Years of life exposed to risk | Deaths | Per cent. Actual of Expected Deaths | | |
|---|---|---|---|---|---|
| | | | Aggregate | First five insurance years | Sixth and later insurance years |
| Total | | | | | |
| All Ages | 6081.42 | 44 | 134.8 | 154.4 | 110.4 |
| Under 40 | 4046.25 | 19 | 128.5 | 182.0 | * |
| 40 and over | 2035.17 | 25 | 140.1 | 131.3 | 151.1 |
| Males | | | | | |
| All Ages | 5041.84 | 39 | 141.6 | 161.4 | 116.2 |
| Under 40 | 3257.17 | 16 | 132.1 | 189.2 | * |
| 40 and over | 1784.67 | 23 | 149.1 | 139.2 | 161.5 |
| Females | | | | | |
| All Ages | 1039.58 | 5 | 98.2 | * | * |

*Ratio not significant because of small number of deaths.

Analysis of these *unoperated* cases, according to the probable reliability of the ulcer diagnosis, gave negative results. Among those cases in which the diagnosis seemed reasonable, because of the duration or recurrence of the condition, there were 22 deaths, or 131.0 per cent. of the expected, as compared with 133.9 per cent., based on 18 deaths, among those cases where the diagnosis

seemed more dubious, because the illness was brief and did not recur. Although both experiences are relatively small, they bear out an opinion, previously formed, that in many of these *medical* cases reporting ulcer, either the physician or the patient, or both, did not really know what was wrong. In view of these results, which are given in detail in the following table, these two groups have been combined in the further analyses of our material.

TABLE 6.

**Mortality of Risks with a History of *Medical Treatment* for Peptic Ulcer According to Probable Reliability of Diagnosis. Ratio of Actual to Expected Deaths by the Basic Mortality Table, 1909-1927. Cases With and Without Complications. By Broad Age Groups at Issue.**

| Ages at Issue | Years of life exposed to risk | Deaths | Per cent. Actual of Expected Deaths | | |
|---|---|---|---|---|---|
| | | | Aggregate | First five insurance years | Sixth and later insurance years |
| Uncomplicated Cases | | | | | |
| All Ages | 5616.82 | 40 | 132.3 | 154.5 | 104.5 |
| Under 40 | 3786.58 | 19 | 136.5 | 191.6 | * |
| 40 and over | 1830.24 | 21 | 128.8 | 122.2 | 136.8 |
| Ulcer | | | | | |
| All Ages | 3030.67 | 22 | 131.0 | 144.9 | 112.2 |
| Under 40 | 1947.92 | 11 | 159.0 | 220.6 | * |
| 40 and over | 1082.75 | 11 | 111.4 | 89.6 | 139.9 |
| Suspected Ulcer | | | | | |
| All Ages | 2586.15 | 18 | 133.9 | 167.4 | 95.7 |
| Under 40 | 1838.66 | 8 | 114.3 | 160.0 | * |
| 40 and over | 747.49 | 10 | 155.3 | 175.4 | * |
| Cases Reporting Hemorrhage† | 464.60 | 4 | 166.7* | * | * |

*Ratio not significant because of small number of deaths.
†These cases are considered true ulcers.

It may be noted that in the small experience on *medical* cases with a history of hemorrhage, there were four deaths, giving

a considerably higher mortality ratio than for those not reporting hemorrhage. Those reporting hemorrhage or perforation in our surgical group with 12 deaths also gave a high mortality. We think it reasonable, therefore, to conclude, in spite of the paucity of the data, that the complication of hemorrhage or perforation leads to a much higher mortality.

### COMPARISON OF SURGICALLY AND MEDICALLY TREATED CASES

Risks with a history of *operation* for peptic ulcer gave an appreciably higher mortality than the *medically* treated group. The ratio of actual to expected deaths in the surgical group was 172.0 per cent., based on 96 deaths, as compared to 134.8 per cent. in the medical group, with 44 deaths.

The difference is not difficult to explain. There is, as we have pointed out, considerable doubt as to the nature of the disease in the medical cases, and the inclusion of cases, unidentifiable, which were not ulcer, has obscured the mortality of the true ulcers. In general, also, the medically treated cases are probably milder than the surgical, because the latter are usually those in which medical treatment was tried but failed to give adequate or permanent relief.

### MORTALITY ACCORDING TO TIME ELAPSED SINCE ILLNESS OR OPERATION

The amount of material at our disposal did not permit detailed analyses in this regard. Distinction was made between those insured within five years of illness and those whose illness occurred over five years before issue. Those insured within five years of illness constituted 65 per cent. of the *surgical* cases and 72 per cent. of the *medical* cases. It should be noted, however, that few cases were accepted within two years of illness. Little difference in mortality was found in the two groups thus distinguished, either in medical or surgical cases. The *surgical* cases accepted five years or less after illness had a mortality 166.4 per cent., compared with 178.5 per cent. for those accepted after a longer

interval. If we exclude surgical cases reporting perforation or hemorrhage, these ratios are 163.7 per cent. and 171.5 per cent. respectively. *Medical* cases whose ulcer occurred within five years or less, had a mortality 134.5 per cent. of the expected, compared with 129.9 per cent. for those with a longer interval between illness and acceptance for insurance. The findings were consistent according to age at issue and duration of insurance. These results are not surprising. We believe that they point simply to the essential chronicity of the disease. This is borne out by the causes of death which will be discussed later.

TABLE 7.

**Mortality of Risks with a History of Peptic Ulcer According to Time Elapsed Since Illness. Ratio of Actual to Expected Deaths by the Basic Mortality Table, 1909-1927. By Type of Treatment and By Broad Age Groups at Issue.**

| Type of Treatment<br>Time Elapsed Since Illness<br>Ages at Issue | Years of life exposed to risk | Deaths | Per cent. Actual of Expected Deaths | | |
|---|---|---|---|---|---|
| | | | Aggregate | First five insurance years | Sixth and later insurance years |
| **Surgical Treatment** | | | | | |
| 5 years or less | | | | | |
| All Ages | 6506.48 | 56 | 166.4 | 154.5 | 181.3 |
| Under 40 | 4405.32 | 27 | 162.2 | 133.8 | 195.3 |
| 40 and over | 2101.16 | 29 | 170.5 | 173.5 | 166.4 |
| 6 years or more | | | | | |
| All Ages | 3464.38 | 39 | 178.5 | 189.5 | 164.8 |
| Under 40 | 1773.39 | 15 | 220.6 | 287.2 | 134.7 |
| 40 and over | 1690.99 | 24 | 159.5 | 144.4 | 178.0 |
| **Medical Treatment** | | | | | |
| 5 years or less | | | | | |
| All Ages | 4171.16 | 27 | 134.5 | 162.5 | 95.4 |
| Under 40 | 3021.00 | 14 | 127.4 | 178.0 | * |
| 40 and over | 1150.16 | 13 | 143.0 | 145.2 | 139.7 |
| 6 years or more | | | | | |
| All Ages | 1842.86 | 16 | 129.9 | 127.0 | 132.9 |
| Under 40 | 974.84 | 4 | * | * | * |
| 40 and over | 868.02 | 12 | 140.4 | 116.0 | 165.1 |

*Ratio not significant because of small number of deaths.

MORTALITY IN RELATION TO BUILD

In regard to this item also, detailed classification was not practicable. Two groups were again distinguished, underweights (5 per cent. or more below average weight) and those of normal weight (within 5 per cent. of the average) or moderately over-

TABLE 8.

**Mortality of Risks with a History of Peptic Ulcer According to Build† Ratio of Actual to Expected Deaths by the Basic Mortality Table, 1909-1927. By Type of Treatment and By Broad Age Groups at Issue.**

| Type of Treatment Build Ages at Issue | Years of life exposed to risk | Deaths | Per cent. Actual of Expected Deaths | | |
|---|---|---|---|---|---|
| | | | Aggregate | First five insurance years | Sixth and later insurance years |
| **Surgical Treatment** | | | | | |
| Underweight | | | | | |
| All Ages | 5155.60 | 54 | 177.6 | 171.8 | 184.8 |
| Under 40 | 2956.94 | 24 | 209.1 | 175.7 | 249.0 |
| 40 and over | 2198.66 | 30 | 158.5 | 169.5 | 144.4 |
| Normal or Overweight | | | | | |
| All Ages | 4824.90 | 40 | 158.9 | 170.3 | 144.3 |
| Under 40 | 3229.90 | 18 | 149.3 | 197.0 | 91.6 |
| 40 and over | 1595.00 | 22 | 167.7 | 146.9 | 195.4 |
| **Medical Treatment** | | | | | |
| Underweight | | | | | |
| All Ages | 2713.07 | 25 | 178.6 | 209.6 | 135.8 |
| Under 40 | 1853.40 | 9 | 128.4 | 188.7 | * |
| 40 and over | 859.67 | 16 | 228.9 | 227.3 | 231.7 |
| Normal or Overweight | | | | | |
| All Ages | 3355.49 | 19 | 102.3 | 109.2 | 94.0 |
| Under 40 | 2192.99 | 10 | 125.3 | 172.8 | * |
| 40 and over | 1162.50 | 9 | 84.9 | * | 116.3 |

†Classified by percentage departures from average weight for height and age as follows:
Underweight—5% or more below.
Normal weight—Within 5% of average.
Overweight—5% or more above, but within limits prescribed for standard insurance.
*Ratio not significant because of small number of deaths.

weight, that is, within the limits acceptable for standard insurance. In *surgical* cases both weight groups gave mortality ratios in excess of the standard, but there was a slight, though definite margin in favor of the normal or overweight group. Their ratio of actual to expected deaths was 158.9 per cent., compared with 177.6 per cent. for the underweights.

In *medically treated* cases, the advantage of the normal or overweight group was definite and plainly marked. The ratio of actual to expected deaths in this group was only 102.3 per cent., practically normal, compared to 178.6 per cent. for the underweights. While there were some differences according to age at issue and duration of insurance, we are not inclined to stress them because the experience is not large enough.

### MORTALITY IN RELATION TO SURGICAL TECHNIQUE

It was thought that improvement in surgical technique and the accuracy of diagnosis might influence the results. This was in-

TABLE 9.

**Mortality of Risks with a History of *Surgical Treatment* for Peptic Ulcer According to Recency of Operation. Ratio of Actual to Expected Deaths by the Basic Mortality Table, 1909-1927. By Age Groups at Issue.**

| Date of Operation Ages at Issue | Years of life exposed to risk | Deaths | Per cent. Actual of Expected Deaths | | |
|---|---|---|---|---|---|
| | | | Aggregate | First five insurance years | Sixth and later insurance years |
| 1920 and Later | | | | | |
| All Ages | 5496.08 | 44 | 163.6 | 178.2 | 124.1 |
| Under 40 | 3465.91 | 18 | 149.5 | 176.7 | * |
| 40 and over | 2030.17 | 26 | 175.1 | 179.4 | 162.2 |
| Prior to 1920 | | | | | |
| All Ages | 4474.77 | 51 | 177.1 | 150.0 | 194.7 |
| Under 40 | 2712.80 | 24 | 208.3 | 183.5 | 223.5 |
| 40 and over | 1761.97 | 27 | 156.3 | 129.1 | 174.8 |

*Ratio not significant because of small number of deaths.

vestigated first in relation to the date of the operation and also in relation to the qualifications of the surgeon. The first part of this analysis distinguished operations performed prior to 1920 and those in 1920 and later. It was found that the mortality ratio of cases operated in the earlier period was 177.1 per cent. of the Basic Table, not significantly higher than that of 163.6 per cent. recorded among those operated in the later period. It must be remembered, moreover, that the Basic Mortality Table is probably too severe a standard for those operated upon in the earlier period, especially at the younger ages, and if allowance is made for that, the difference between these two groups of surgical cases disappears. Frankly, we are a little disappointed in this result. We had hoped to show an improvement in the more recent cases.

In the second part of this analysis, we segregated cases in which the operation was performed by an especially qualified surgeon. This group of cases had a mortality 156.0 per cent. of the Basic Table, as compared with 182.2 per cent. for those operated by surgeons of unknown ability. The true difference between these two groups is probably larger, because in many instances we did not know the name of the surgeon, and such cases are, of course, included in the group operated by surgeons of unknown ability. We are gratified to find this difference. Operative mortality, of course, is not included and our results relate to mortality subsequent to operation.

It is interesting to find that the difference between the two groups seems to be restricted to the long-term results. For the experience in the sixth and later insurance years was much better in the cases operated by especially qualified surgeons than in the other cases, whereas in the first five insurance years, the ratios were identical.

It will be noted, however, that even in the group operated on by the better qualified men, the results were essentially substandard, and that this should be so is not surprising considering the severity and chronicity of the disease, wherein the ultimate prognosis depends not only on the skill of the surgeon but also on the patient's willingness to take good care of himself.

TABLE 10.

**Mortality of Risks with a History of *Surgical Treatment* for Peptic Ulcer According to Qualifications of Surgeon. Ratio of Actual to Expected Deaths by the Basic Mortality Table, 1909-1927. By Age Groups at Issue.**

| Surgeon Group Ages at Issue | Years of life exposed to risk | Deaths | Per cent. Actual of Expected Deaths | | |
|---|---|---|---|---|---|
| | | | Aggregate | First five insurance years | Sixth and later insurance years |
| Cases of Especially Qualified Surgeons | | | | | |
| All Ages | 3969.33 | 34 | 156.0 | 170.5 | 137.3 |
| Under 40 | 2540.99 | 17 | 171.9 | 209.5 | 129.3 |
| 40 and over | 1428.34 | 17 | 142.9 | 141.4 | 144.9 |
| Cases of Other Surgeons† | | | | | |
| All Ages | 6047.93 | 62 | 182.2 | 170.8 | 196.1 |
| Under 40 | 3673.17 | 26 | 189.5 | 169.7 | 214.5 |
| 40 and over | 2374.76 | 36 | 177.3 | 171.6 | 184.0 |

†Includes those in which name of surgeon was not reported.

## IV

### CAUSES OF DEATH

Recurrences of peptic ulcer, cancer of the digestive tract, especially of the stomach, and other digestive diseases were almost entirely responsible for the excess mortality among these risks with a history of peptic ulcer. Of the 140 deaths in the whole group, 59 were due to these few causes. Of these deaths, all from digestive tract disease, 29 were due to recurrent ulcer (21 gastric and 8 duodenal), 18 to digestive tract cancer (13 gastric) and 12 to other digestive tract conditions. In addition, ulcer was reported as secondary in three deaths from other causes and one suicide was reported to be suffering from the condition at the time of his death. Degenerative cardiovascular or renal diseases were responsible for 28 deaths, but the mortality was not high except in the case of coronary disease and angina pectoris, which caused

10 deaths. This finding may be significant in view of the upper abdominal symptoms in these conditions. Tuberculosis accounted for 10 deaths and pneumonia and influenza combined for nine. The only other notable cause of death was accident, with 11 deaths.

The number of deaths among females in this experience is small, so that little is to be learned from comparison of the two sexes. It may be noted, however, that digestive tract diseases accounted for four of the 12 deaths in female cases and tuberculosis, for three deaths.

Recurrent ulcer showed by far the greatest excess mortality. In an experience the size of the present one, only two deaths from this cause would be expected, compared to 29 which actually occurred. One must bear in mind, moreover, that these deaths from peptic ulcer do not represent the true measure of recurrence. Many of these risks probably have had non-fatal recurrences, but the number is not known. Digestive tract cancer was over twice as frequent as expected, largely due to the excess mortality from *gastric* cancer. Deaths from cancer of other parts of the digestive tract were little, if any, above the normal frequency. Non-malignant disease of the digestive tract, excluding peptic ulcer, was about 50 per cent. higher than normal.

Comparing the *medical* with the *surgical* cases as to causes of death, we found that, in both groups, recurrent ulcer was prominent. In the *surgical* group, cancer of the digestive tract, especially gastric cancer, was relatively more frequent, the number of deaths being several times the expected, whereas in the *medical* group, digestive cancers were slightly, if any, above normal. Other digestive tract diseases were likewise excessively frequent only in the surgical group. In the medical group, they were of normal incidence.

Significant differences were found between deaths from gastric *ulcer* and from gastric *cancer* in relation to the interval from the date of the original illness to death and in relation to the duration of insurance. In our deaths from recurrent gastric ulcer, the median interval from the original illness to death was 7.8 years, and the median duration from issue to death was 3.1 years. In

gastric cancer, on the other hand, the figures were 6.0 years and 1.3 years, respectively. In half the deaths from gastric cancer, the interval since illness was less than five years. All these deaths were cases with an original history of surgical peptic ulcer. Moreover, 8 out of 13 deaths from gastric cancer occurred within two years of issue. In seven of these, the original history was surgical peptic ulcer and the remaining case had a history of medical treatment for ulcer, complicated by hemorrhage.

In deaths from *duodenal* ulcer these intervals were slightly shorter than in *gastric* ulcer, but in view of the small number of

TABLE 11

**Number and Relative Frequency of Deaths Among Risks With a History of Peptic Ulcer From All Causes, Recurrent Ulcer and Other Digestive Tract Diseases and Cancer of the Digestive Tract. By Type of Treatment and by Build.**

Relative frequency of specified causes denoted by following symbols: =, approximately normal; +, high; ++, very high; +++, extremely high; —, low. Where no symbols appear, number of deaths was too few to be of any significance.

| | All Causes | | Number of Deaths | | | | |
|---|---|---|---|---|---|---|---|
| | | | Recurrent Ulcer | | Other digestive tract diseases | Cancer | |
| | Number of deaths | Per cent. actual of expected deaths | Gastric | Duodenal | | Gastric | Other digestive tract |
| Total | 140 | 158.3 | 21+++ | 8+++ | 12+ | 13+++ | 5= |
| Surgical | 96 | 172.0 | 12+++ | 5++ | 9+ | 11+++ | 4 |
| Medical | 44 | 134.8 | 9+++ | 3+ | 3= | 2 | 1 |
| Build Group | | | | | | | |
| Surgical | | | | | | | |
| Underweight | 54 | 177.6 | 6+++ | 4+ | — | 9+++ | 4+ |
| Normal or Overweight | 40 | 158.9 | 6+++ | 1 | 9+++ | 2 | — |
| Medical | | | | | | | |
| Underweight | 25 | 178.6 | 6+++ | 1 | 1 | 2 | 1 |
| Normal or Overweight | 19 | 102.3 | 3+ | 2 | 2 | — | — |

duodenal ulcer deaths, the differences are not significant. In deaths from other digestive tract conditions, both malignant and non-malignant, the intervals were much longer than in deaths from peptic ulcer and gastric cancer.

In both the underweight and the average or overweight groups, the incidence of deaths from recurrent ulcer was high, but there seemed to be a somewhat larger excess in the case of the underweights. This was true in both surgical and medical groups. In cancer, on the other hand, the underweights were wholly responsible for the excess. Other digestive tract diseases were more frequent among overweights, particularly in the surgical group.

## V

### SUMMARY AND CONCLUSIONS

1. The mortality experience on 3,135 risks with a history of peptic ulcer was studied, of whom 1,905 were operated and 1,230 treated medically. The great majority of these cases were males. Facts on the site of the ulcer were generally unreliable.

2. In surgical cases, the mortality was 172.0 per cent. of the expected by the Basic Mortality Table. No significant differences were found by duration of insurance. The experience on risks over 40 years of age at issue was slightly better than that on younger risks.

3. Surgical ulcer cases in which simultaneous appendectomy had been performed had a relatively low mortality, namely, 126.3 per cent. of the expected.

4. In surgical cases with a pre-operative history of perforation or hemorrhage, the mortality, 206.2 per cent. of the expected, was higher than that recorded in uncomplicated cases, 168.0 per cent.

5. The mortality of surgical cases of duodenal ulcer was slightly lower than that for gastric ulcer, so reported. But the poor reporting of the site probably obscures the true results on the gastric cases.

6. In medically treated peptic ulcer cases, the mortality was 134.8 per cent. of the expected, or appreciably lower than that recorded for surgical cases. The experience on medical cases was

slightly better in the sixth and later insurance years than in the earlier years, but there was no difference in mortality according to age at issue.

7. Cases insured within five years of illness showed the same mortality as those insured after a longer interval, both in surgical and medical cases.

8. Underweights with a history of peptic ulcer had a higher mortality than those of heavier build. This was consistent for surgical and medically treated cases.

9. No difference was found in mortality of cases operated since 1920, as compared with those operated in earlier years.

10. Cases operated by especially qualified men did better than the run of surgical cases.

11. Deaths from recurrent ulcer and gastric cancer were extremely frequent and were largely responsible for the excess mortality. The death rate from other digestive tract conditions and from coronary disease and angina pectoris was also high.

Our study of the Metropolitan's experience on cases with a history of peptic ulcer shows definitely that they are largely substandard. All surgical cases are, in fact, substandard and additional ratings are called for where there is a history of *pre*-operative perforation or hemorrhage. A *post*-operative history of hemorrhage, perforation or recurrent or marginal ulcers warrants rejection. On the other hand, a simultaneous appendectomy in surgical cases is not an unfavorable factor.

In regard to these surgical cases, the results, both of this and other insurance studies, must, we believe, be construed as applying pretty much to duodenal ulcer. The reporting of the site of the ulcer in the general run of cases is so poor that we may assert that our insurance experience affords no adequate basis for judging the true rating for gastric ulcer. The large difference in mortality between duodenal and gastric ulcers in the published experiences of several clinics, despite their inadequacies, must, in the meantime, guide us in the rating of such cases. Investigation of the prognosis of gastric ulcer for insurance purposes is badly needed, and it is hoped that it may soon be done on the basis of a joint study by several companies of cases in which a

full hospital report is available or on the basis of a follow-up study of one or more of the large surgical clinics.

In surgical cases, we may be somewhat more lenient where we know that the operation was performed by an especially qualified surgeon or was done in the best grade clinics. To aid us in gaining this information, we should try to get a statement from the surgeon. This should give us an estimate not only of his ability, but also of the credibility of the statement. We may then have reliable information on the site of the ulcer. Where the statement is not satisfactory or we cannot get one, we should be more cautious in our ratings. We must not forget, however, that the prognosis in surgical peptic ulcer is by no means entirely in the hands of the surgeon, but to a very large extent, is up to the patient.

Applicants with a history of medical treatment for peptic ulcer can, on the whole, be given lower ratings than the surgical cases, except those with a history of hemorrhage which definitely calls for a high rating. In general, the cases that do not come to operation are, on the average, milder than cases which are operated. We must not lose sight of the fact, however, that our experience, as well as that of other insurance companies on medical ulcers, does not truly portray the prognosis, because these experiences contain a number of cases in which the original ailment was not ulcer. In order to be accurate, we need a careful diagnosis by an expert. We can then select the better cases.

The chronic nature of peptic ulcer, of which there are many evidences in this study, means that we cannot pay much attention in our ratings to the period elapsed between illness and application for insurance. Likewise, there is no real basis for differential ratings according to age. While it is true that the mortality from cancer of the stomach increases definitely with age, a surprisingly large number of cases have their onset of malignancy in the thirties. Moreover, the excess mortality from recurrent peptic ulcer overshadows that from gastric *cancer*.

So far as our small experience on women with a history of peptic ulcer goes, no differential ratings according to sex are warranted.

Consideration should be given to the build of the applicant in rating a history of peptic ulcer. The fact that he has been able to gain or maintain his weight is a favorable sign, especially in the medically treated cases. Indeed, persons who are of normal weight or moderately overweight in this medical group can safely be taken with little extra rating a few years after their illness if there were no complications. In surgical cases, the difference in favor of the heavier builds is slight but may be given consideration in borderline cases.

In regard to cancer, there is not much we can do to protect ourselves. In some of our deaths from gastric cancer, especially where the period from illness to death was relatively short, it is entirely likely that the original illness was cancer of the stomach, although the original diagnosis was incorrect or unknown to the applicant. On the other hand, some of these applicants probably knew but concealed the facts when they applied for insurance.

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Dr. Wells—The discussion of this very important paper will be opened by Dr. Walter C. Alvarez, Associate Professor of Medicine at the Mayo Clinic. For nearly thirty years Dr. Alvarez has been primarily engaged in research and teaching capacities, and during this time has published well over two hundred articles. I know of no one who is more eminently fitted to discuss the medical aspect of gastric and duodenal ulcers.

Dr. Alvarez—It is a pleasure to be with you here again, and it is a privilege to be able to discuss this excellent paper. It is a splendid study; I am sure it will be helpful to you. I know it has been very helpful to me. I agree with practically everything that Dr. Dublin has said, and where I don't agree, I haven't the evidence that would enable me to argue with him.

We in the practice of medicine are all terribly handicapped by our inability to find out what happened to the patient after we said goodbye to him in the office. That holds particularly true for a man like myself, who practices in a small town on patients who have come from a distance. In most cases I find it difficult to learn what happened to them later. I think it is this difficulty which accounts for much of the slowness of advance in our knowledge of medicine, and that is why it is such a joy to me to

see these studies coming out from you men who are able to follow up and find when these people died, and perhaps how they died. That is what I would like to know about the people whom I see: what happens to them afterwards, how do they die, when do they die, and of what do they die. Often, as you know, you find out only that one has died. For instance, about a year ago, I saw a patient in whom we made the diagnosis of duodenal ulcer. The other day I heard through a friend of his that he suddenly got an "acute abdomen" down on his ranch in Mexico and died after a few hours. The diagnosis was acute appendicitis. My hunch is that it was an acute perforation, but, again, it may be that our diagnosis was wrong and the duodenal ulcer, diagnosed by X-ray, was not his real trouble.

So even when we get some information it may not help us very much. I would like to know also what happens to that large group of patients who don't take our advice, and do not get any adequate treatment.

What I would like much to know is, in how many cases of ulcer, is our treatment really helpful beyond the first attack? Here comes a man with hunger pain who says, "I am miserable at half past ten in the morning and four in the afternoon, and I awake at one in the morning." Let us say that I tell him to take a little vacation, to quit smoking heavily, and to take some food at ten in the morning, at three in the afternoon, and when he goes to bed at night. In most cases, if such a patient follows this advice, he will return after two weeks to say that he has been perfectly comfortable. But is he well? No. What I expect him to do is to go along fairly well; perhaps after a month he can stop taking food between meals; he won't feel the need for it any more; and then, in six months or a year or two he is back exactly where he was before. I think that has been the experience of most of us as to what happens to these patients with ulcer. Ulcer is commonly a life-long disease, it is the result of a tendency, perhaps inherited, and then aided and abetted by the strenuous life that we lead.

Now, is there anything that any of us can do to these patients that will really alter their tendency to recurrences of the ulcer syndrome?

So far as I know, there is nothing really curative that we do medically except perhaps when we can alter the habits of the individual or relieve the strain on him. That lessens his tendency to return with ulcer symptoms. Perhaps it affects the mechanism that produces an ulcer.

Incidentally, I might take a few minutes to tell you about current theories as to ulcer causation. The best information we have comes from the laboratory. Mann showed that one can make duodenal ulcers in practically a hundred per cent. of dogs operated on by shunting the normally protective pancreatic juice and bile away from the duodenum and upper jejunum. This suggests that in cases of duodenal ulcertation in man, something must have happened to stop the flow of the pancreatic juice, the fluid with the greater alkalinity and power to neutralize the acid as it comes out of the stomach. Something may happen also to the important neutralizing action of the duodenal mucosa and juice. Let us keep these facts in mind now as we contemplate the clinically well-known fact that if a patient with a tendency to ulcer meets grief, or worry or overwork or nervous tension, he gets a recurrence of symptoms.

There seems then to be one logical explanation for flare ups in duodenal ulceration. Here is the pancreas which protects the duodenum from contact with a too acid juice. We know from the Russian physiologists that when they made a pancreatic fistula in a dog, they had a terrible time getting information because the flow of juice was so easily inhibited by psychic influences. They had to keep the animal in a sound-proof room, all alone, and even then there were puzzling inhibitions. The next interesting, and I believe most significant, observation is that the pancreatic secretion is promptly inhibited by very small amounts of the adrenalin which, as Cannon showed, is poured out under the influence of fear and emotion and fatigue.

Hence it is that I believe that the cause in many cases of ulcer is a nervous inhibition of the pancrease which leaves the duodenal

mucosa unprotected from acid long enough for an ulcer to form. But this is all by the way.

Now, actually, what do we do when we treat ulcer? We give food every two hours, and this not only dilutes and neutralizes the acid in the stomach, but as two groups of experimenters have shown independently, the products of protein digestion soak into the mucous membrane and in some way and for some time protect it from the injurious action of acid. But this is temporary; we relieve the man, perhaps we help to heal his ulcer, but he is still likely to get another one.

Now what can the surgeon do in a really curative way? His favorite operation is a gastroenterostomy which side-tracks the duodenum, takes the strain off it, and in most cases leads to the healing of the ulcer. It would be an almost perfect operation if it were not for the fact that the jejunum is more sensitive to the action of unbuffered acid than the duodenum is, and as a result, in some three to twelve per cent. of cases, depending on the statistics that one reads, an ulcer forms just below the stoma, and then the patient is likely to be in serious trouble. The new ulcer is often more painful and more dangerous than the old one because it tends to bore through the jejunum and perhaps into the colon. Actually, today, gastroenterologists and gastric surgeons are terribly afraid of jejunal ulcer. A man with a duodenal ulcer can usually "get by" with or without medical treatment; he can keep at work and life is bearable; but once he has a gastrojejunal ulcer, he is likely to have to stop work, he may wake with pain several times a night, and not infrequently, he returns for operation several times in a desperate effort to get back some modicum of health.

Usually the surgeon "takes down" the gastroenterostomy and closes the openings in stomach and bowel, but then the patient, after two serious operations, is back just where he started. Perhaps, in an effort to avoid this impasse, the surgeon, in addition to taking down the gastroenterostomy, excises the ulcer, if it is on the anterior wall of the duodenum, and closes with a pyloroplasty. But, unfortunately, the worst ulcers are commonly on the posterior wall where they cannot be excised, or if one is

cauterized and sewed over, there is no reason why another cannot form later. The cause has not been removed, and the underlying predisposition may not have been changed. Perhaps a partial gastric resection is done, and this is a good operation with a high percentage of good results, but it too has that miserable small percentage of bad results. I look forward to the day when we will know how to operate so as to get rid of the underlying predisposition to ulcer.

Now, why are questionnaires unreliable? In the first place, we hear from only a certain number of the patients, and we don't know what percentage of the others from whom we didn't hear were dead, or perhaps disgruntled because of a poor result, or perhaps too well to care to talk about their old trouble. Any statistician knows how badly this uncertainty must invalidate some of the conclusions that we would like to draw from the information that has come back. Then there is the bias of a patient. If he hasn't paid his bill he may feel uncomfortable about admitting that he is perfectly well. And then, there is the possibility that the secretary who abstracts the reports or the man who writes the paper is overly optimistic or overly pessimistic.

I think I was the first man in the United States, years ago, to get up at a meeting of the American Gastro-Enterological Association and say that I didn't think many of my patients with ulcer were staying cured; many were being helped for a while, but most of them, sooner or later were back as bad as they were before. You should have heard some of the older men telling me that maybe *my* patients didn't stay well, but *theirs* did! I asked them how they knew; who of them had made any follow-up studies. None had. Then Crohn made such a study and found that about 80 per cent. of the patients on medical treatment felt fine when they left the hospital, but at the end of five years, there were only between 35 and 50 per cent. left who were getting along comfortably.

Dr. Dublin is perfectly right: most patients don't know where their ulcer is, and sometimes a physician who is in a hurry tells a patient with duodenal ulcer that it is gastric simply to save

time. The patient knows about the stomach but he never heard of the duodenum.

Even an X-ray diagnosis made by a competent man has a small percentage of error which you men must take into account. It is difficult sometimes to see an ulcer in the duodenum if it does not produce much puckering or deformity. Furthermore, even a good roentgenologist may stop looking when he sees a big ulcer in the duodenum. He may be satisfied that the diagnosis is made, and perhaps the surgeon also is satisfied at operation, but if an accident happens and a necropsy is done, one or two more ulcers may be found in the stomach. This possibility, expressed by Robertson with the figure 7 per cent. (based on experience at necropsies), will affect your risks.

There is yet another difficulty. I see many patients every year with a badly deformed duodenum; perhaps they have an actual ulcer there; I don't know; but I do know that their symptoms are not those of ulcer and their problem is not that of ulcer. I remember a little woman recently who had been treated for ulcer by four or five good physicians without avail. Her symptoms were not those of ulcer; they were those of a neurosis. I found that her real difficulty was that she was crazy to get rid of a husband who was a horrible bore to her, but they had a child, they handn't enough money to live separately, and the woman was too ill and upset to work. It is useless to try to treat such a woman with ulcer diets.

Another difficulty is that in so many of the cases that you and I see, the diagnosis of ulcer has been made without the help of an X-ray examination. Now, it is often easy to make this diagnosis on the basis of the history alone, but after listening to these patients for something like twenty-five years, I know I can often be deceived. Sometimes the story sounds pretty typical, and yet no ulcer can be found with the X-ray. Some of my friends will say: "Well, if you operated on the man you would find it." But time and again, in this type of case, I have seen a surgeon go in and not be able to find an ulcer. One day, McVicar, a doubting Scot, said to me, "If you had a necropsy you could find it." Curiously, that very day we saw a patient with a good

ulcer story. A pulmonary embolus took him off following an exploratory operation which failed to show anything, and then the necropsy failed to show anything organically wrong. So I am certain of one thing, and that is that for almost every patient I see with ulcer, I see another patient with what I call pseudo-ulcer, for want of a better term. Last summer, for one reason or another, usually at the patient's insistence, we operated on several of these people, and the surgeon couldn't find a single, solitary sign to explain the symptoms of ulcer. In one or two of the cases the patient had suffered with hematemesis, and even then we couldn't find any ulcer.

If you know the history of ulcer in all its variations, after listening to it for years, you get so that you can often pick out the man with the pseudo-ulcers. You can't always do it, but there are little distinguishing features. For instance, a man will have his pain in the morning before breakfast, or he has gone for years without typical remissions and yet he is no worse. I know physicians who have had hunger distress off and on since youth and yet it does not get any worse; they will have innumerble negative X-ray examinations; the trouble may never interfere with their work, and they do not come to any bad end. In my experience, people with such a typical ulcer pain seldom develop real ulcer. To recognize this group must, then, be a very important thing for you insurance men because, so far as I know, these people are satisfactory risks.

As I said before Dr. Robertson, our pathologist, finds that 7 per cent. of patients with duodenal ulcer have a gastric lesion as well. This association is doubtless more frequent in Europe, and I think it is probably more frequent in the East Side Jew of New York than it is in our Swedes out in Minnesota. Our X-ray men usually find about ten duodenal ulcers to one gastric. Our autopsy statistics show a somewhat different ratio, and the ratio varies throughout the world. All I know is that gastric ulcer, particularly in women, is a rare disease. I seldom see gastric ulcers in spite of the fact that I have an enormous material out of which to pick.

Remember, also, how often gall bladder disease can be associated with ulcer. I found that in at least 11 per cent. of a group of men operated on for duodenal ulcer there was a record of gall bladder disease. With gastric ulcer the percentages were not so high. As you know, the presence of cholecystitis adds to the insurance risk.

Hartman and Rivers at the Mayo Clinic studied 700 patients operated on for duodenal ulcer. The appendix was removed and said to be diseased in 440 but I don't know how much that means because it is a rare pathologist who will ever report a normal appendix. You men must always take these human peculiarities into account in interpreting statistics.

As to the sex incidence of ulcer, there is no doubt in my mind about the ratio of from three to five males to one female. I once studied this ratio for thousands of patients seen in the course of years. The figure varied, following a curve which began about 3 per cent., went down to about 2 per cent., and after several years went up to 5. This ratio varied also in Germany where it followed a curve somewhat affected by the war.

Now as to the much questioned dangers of cancer "developing" in gastric ulcer. Unfortunately there is much misinformation in the literature and some men continue to disregard statements made in the last ten years from the Mayo Clinic; they go on quoting or misquoting from papers that were written perhaps twenty-five years ago.

Actually, our contention is not that gastric ulcers generally become cancerous; this probably occurs in about 5 per cent. of cases; what we maintain is that we cannot for the life of us exclude the presence of cancer in an ulcer-like lesion *when we first see it*. Especially if the man is elderly, and his history of indigestion or ill health is short, we feel that the "ulcer" must be looked upon as cancerous until it is proved otherwise. But how can you prove it otherwise? The common, and at present most accepted way throughout the country is to give the patient medical treatment and let him go for a year or so to see if he gets well or dies. Of late the more enlightened type of physician has been treating such a patient medically, but he has kept watching

him carefully with the X-ray every two or three weeks to see if the lesion is healing. If the ulcer heals completely in a month or so, it is probably benign; and if it doesn't heal or if it gets larger, it is probably cancerous.

Another method is to cut the lesion out and put it under the microscope. Unfortunately this carries a mortality which varies from 5 per cent. at the best to perhaps 50 per cent. for the inexperienced man. For this reason the method of watchful medical treatment is often best especially when abdominal surgeons of the highest skill are not available.

I think the point that will be most helpful to you will be this: If a person has had a gastric lesion treated medically or surgically eighteen months before and is still alive and well, most of the danger from cancer has passed. Most of the people I see with cancer of the stomach, not entirely removed by a surgeon, are dead within the year, and most of the remainder are gone in two years.

It is an interesting thing to me, and doubtless to you, to see how many of the people who, after consulting a physician for relief of symptoms suggesting ulcer or cancer and receiving a clean bill of health, want to get insurance. Day after day I get letters from such people saying, "I wish you would send a report to such-and-such insurance company".

Now you realize better than I do how important it is that the diagnosis on these people shall have been made correctly. If we were wrong, and you accept our optimistic report, you lose money. In many of these cases you doubtless do what I would do and hold off for a year or two. That will rule out a lot of trouble.

An interesting thing to me, often, is that my assistant, who is a well-trained young man, who has been exhorted repeatedly to take better histories, will write that a man of fifty has had hunger pain for four months. I read that history and turn to the patient and say, "You don't meant to tell me you have had this thing for only four months". Or I will ask his wife and she will say, "Why, Bill, you were vomiting and going out to take some food or soda when we were on our honeymoon thirty years

ago". If you go after it, you can usually get this old history, and sometimes it makes a difference in your prognosis. It shows that the disease is very chronic and therefore largely incurable.

One thing the care of hundreds of patients with ulcer has taught me and that is that ulcer is a life-time disease in many people. Unfortunately, I can seldom keep in contact with these patients long enough to know how they ended their days. I have an idea that in some cases, in the later years of life, the ulcer must become scarred and the tendency to recurrence must die out. I hope it does, but I need statistics to prove it.

Robertson and Hargis at the Mayo Clinic once made a particular study of 2,000 subjects at autopsy, and they found signs of healed or active ulcer in practically one out of five, or 18.9 per cent. That is much higher than in most other statistics. For instance, Stewart's statistics from England give a figure of 5 per cent.

Robertson tells me that years ago before he started looking for duodenal ulcer, he thought the incidence was around 5 or 7 per cent. but later he looked for the scars more carefully and learned how to recognize them. Then he found them often.

Ulcer is often a disease of occupation, and if I can't change the occupation and take the strain off the patient, I cannot help him. Here is a sample of what I am up against in many cases. The patient was a man who sits all day at a desk with three telephones in front of him. He is like a spider in the center of a huge web or wires running out to freight yards and produce exchanges in the Middle West. Here, let us say, comes from California a car laden with asparagus. Before this can be delivered in Chicago the price of asparagus drops there to a point at which there could be little profit made. But my patient knows that the price is good in Kansas City so he instantly orders the car sent to Kansas City. But before it arrives the price there drops and he shoots the car to Omaha and makes a profit. It took him ten years to learn this intricate business; his decisions

must be instantaneous and most of them must be right. No wonder he has a bad ulcer. And how can I hope to help him? How can even a surgeon hope to help him, when the cause would be left to produce a new ulcer as soon as the old one was cut out?

As Dr. Dublin told you, according to different statistics, from 50 to 85 per cent. of patients get well under surgical treatment. If we could only learn to avoid the small percentage of very bad results after surgery, I would be strong for operating because I feel that the surgeon has a better chance of working a permanent cure than I have. But one patient in thirty or eight, of those operated on according to the statistics one reads, will get into so serious a predicament that a physician cannot forget the possibility that the patient before him may be one of the unfortunates.

I might spend time telling you about the best results that can be obtained in the surgical treatment of ulcer—I am thinking of papers like Balfour's classic on the results obtained in 100 physicians—but you men are not so interested in that. Your applicants are treated by Drs. Tom, Dick, and Harry all over the United States and you would like to know their results. Unfortunately I cannot tell you their results, but I can tell you about those obtained at the Peter Bent Brigham Hospital and they are discouraging enough. This study, by Emery and Monroe, is based on follow-up studies on 1,435 cases. Since these patients were cared for in the teaching hospital of Harvard no one can argue that the treatment was poor or unscientific.

Most of the patients had duodenal ulcer. After several years, only six per cent. appeared to have died because of the ulcer. There were 161 patients who died from all causes. In only 6 per cent. of the total group did death come from the ulcer. Hemorrhage accounted for 20, perforation for 28, obstruction for 4, and associated diseases and complications for 35. Since the average age at death was 59 years, Emery and Monroe conclude that, on the average, the disease doesn't shorten life. I think it was one of your insurance men who said once that the greatest danger run by a patient with duodenal ulcer is that he will be operated on by a poor surgeon.

Here is an interesting and very hopeful statement by Emery and Monroe: Out of 1,012 patients with duodenal ulcer, there were 872, or 86 per cent., who did not get particularly worse with the years. This is our experience with many of these patients. They get along pretty well for thirty or forty years without much if any sign of advance in the disease. Others, to be sure, get into trouble with obstruction and vomiting and emaciation.

In Emery and Monroe's group there were 126 patients who were not treated, and 52 per cent. of these reported themselves well after several years. This is a larger percentage of cures than that obtained with medical treatment, but we must remember that the patient who isn't treated is the fellow who isn't suffering very much. The man who gets a lot of medical treatment is suffering more, and the man who gets operated on several times probably had a bad case to begin with; one with so much suffering that he was ready to take anything that was offered him.

According to Emery and Monroe, surgical treatment showed the highest percentage of long-continued relief, but the results were poorer than in the case of medical treatment. Jejunal ulcers were diagnosed in 11.3 per cent., and we can be pretty sure that Emery and Monroe didn't hear of all such cases because when a patient gets a poor result he sometimes seeks help in a new place and does not answer his questionnaire.

Emery and Monroe found that results were better the more careful and more lasting the medical treatment. I would expect this, and I often say to a patient, "If you could only take care of yourself properly, you would probably get along very nicely, but when you have to go back to a strenuous job or to family strain and grief, you must get into trouble again".

We often say that patients seldom bleed to death with ulcer. Of Emery and Monroe's patients, 20 bled to death. That number represents 5.2 per cent. of those who bled or 1.3 per cent. of the total number.

I think ulcer is often a milder disease in women, and if they are operated on, there is much less danger of recurrent ulcer than there is in men.

I hate to start operating on young people with severe ulcer. The other day I saw a big husky boy of 19 years with a severe type of ulcer. His problem depressed me for some time afterwards because I felt so discouraged about him. He would be a poor risk for insurance.

I fear patients who bleed more than once. Around the clinic we say that a patient who has bled three times is going to bleed again and had better be operated on.

The longer the period of good health after an ulcer cure the more favorable the outlook for the future, but one cannot always be sure that years of immunity have brought security. A few months ago I saw a man who fifteen years ago had had a severe hemorrhage; for fifteen years he did not have much trouble with his ulcer and he did not bleed. Then he went on a hard hunting trip with his doctor—imagine!—and got all worn out. His ulcer flared up badly, and again he almost bled to death.

If a patient is well for three years after a gastroenterostomy, one can be very hopeful that all danger is past, but one cannot be sure. I have seen a jejunal ulcer come eighteen years after the operation.

We have tried desperately to pick the patient who will do badly after operation. We have looked to see if he has a higher pepsin or a higher acidity or something like that, but we can't find any criterion yet, except a tense nervous temperament. On the basis of this temperament, we think we can sometimes pick the ones who must not be operated on, but I don't know how good we are at it. Only statistical analysis will show.

To sum up, then, treat the problems of duodenal ulcer and gastric ulcer separately. Assume that every gastric lesion in a person past forty and with a short history is cancerous. Always hold over a patient treated for gastric ulcer for two years. If he is well then, he probably hasn't cancer, and that will greatly reduce the risk.

About 60 per cent. of the patients with duodenal ulcer have a lesion that is bearable; they can get by without much risk to life if they are not operated on by a poor surgeon and if they don't bleed or perforate. In the 40 per cent. that remains, you can

be sure of a great deal of recurrent disability; perhaps even an inability to earn a living, and some added risk to life, as Dr. Dublin has shown us. I hope in the next ten years that we will find some treatment that will remove the cause.

I find that many physicians and surgeons are now saying to the patient who is getting by fairly comfortably, with long remissions, "So long as you can do so well and can work, you might as well wait until medical research gives us something better in the way of curative treatment. But if you bleed several times, or if you get obstructed, or if you suffer so that you can't sleep and can't work, and if you cannot control the symptoms with a Sippy cure in a hospital, then you will have to submit to an operation".

Dr. Wells—Those of us who attended the meeting in this hotel three years ago will never forget the masterly address on thyroid disease delivered by Dr. Frank H. Lahey of the Lahey Clinic in Boston. We are therefore more than pleased that Dr. Lahey has consented to visit us again today and discuss the surgical aspect of gastric and duodenal ulcers.

Dr. Lahey—Mr. President and Members of the Association: I have been very much interested to read Dr. Dublin's paper and hear it. It contains a great deal of information which is interesting and of value. It is difficult for me to discuss this paper because I do not think of the subject perhaps in exactly the same terms that you do. On the other hand, you have listened to Dr. Alvarez who has had such a rich and extensive experience with ulcer, and who has lived so intimately with these problems, and with him I agree absolutely, even as relates to the surgery. I have no resentment or disagreement. I believe that the whole situation is as badly muddled as it possibly can be. I think we have no real conception of the origin of ulcer; we have far from satisfactory measures for dealing with ulcer, and I think that we need a great deal of light about the whole situation. I hope, as he does, that in the next ten years will come something which is more satisfactory than what we have now.

I agree that surgery, particularly the surgery which we have had up to the present time, is dangerous, followed my many complications, and, as he says, by an ulcer which is even worse, more intractable and more dangerous than the original ulcer, having associated with it a higher mortality than the original ulcer for which the patient was operated. Therefore, one has to be quite frank. Furthermore, everyone who knows our Clinic knows the conservative slant which I have about peptic ulcer. I do not possess the surgical enthusiasm which existed throughout the past years as to the management of ulcer. The reason I do not is because a number of years ago I became very much dissatisfied with the surgical management of ulcer, and I said we will junk the surgery of ulcer and we will start with the conception that no ulcer is primarily surgical; that every ulcer is primarily medical, and becomes surgical as it emerges through complications or medical failure. By this plan one can approach this problem with a clear conscience and with a situation established whereby the patient has to put up with the symptoms and the dangers, or accept surgery, even with its defects, disadvantages and mortality.

As I talk to you on this subject it must be in a general way. I do not posses the familiarity with your needs as relates to ulcer and insurance to discuss this problem with you other than from my general experience, and I will perhaps add but little to what Dr. Alvarez has already said, but will present our experiences, and they may be just a little bit different.

We are a much younger clinic than his clinic. We see many less patients, I am sure, than they do in Rochester, but we have now had under observation, largely in the hospital, about 2,100 ulcers. These ulcers come mostly from New England, which is a thickly settled region, and it has been quite possible in a good many of these cases to get them back and to do quite accurate follow-ups on them.

The percentage of gastric ulcer as compared with duodenal ulcer, as presented in Dr. Dublin's statistics, I think must be wrong, because the examining doctors have not made accurate diagnoses. We have had 190 gastric ulcers out of this 2,100, and that has been about the average. We average from one to

nine, to one to ten gastric to duodenal. We have had somewhere in the neighborhood of ten per cent. gastrojejunal ulcer and of the gastrojejunal, we have had in the neighborhood of eleven per cent. with fistulae into the colon, the very worst thing that can be associated with gastrojejunal ulcer.

There are certain outstanding features connected with ulcer, and they are hyperacidity, particularly in the duodenal ulcer, and pylorospasm. Rarely will these two features be absent. I think the pseudo ulcer which Dr. Alvarez speaks of you have all had. You only have to go and do something in the way of drinking or eating that will upset your stomach to get a pylorospasm, and then you have to empty your stomach. If you do, you have immediate relief from the pylorospasm. If you have a duodenal ulcer you will be relieved temporarily in exactly the same manner, and if you take enough alkali you will be relieved of the pylorospasm. If you have a duodenal ulcer and you are operated on and the pylorospasm is relieved, you will be relieved in exactly the same way. Your ulcer symptoms will let up if you are given a proper diet, frequent feedings, or anything you choose which will neutralize the acidity.

In both the medical and surgical treatment we know that you get the good end results when you get low gastric acidities.

I think that gastroenterostomy is a very poor operation. I think that gastroenterostomy is not a proper operation to be applied routinely to the treatment of duodenal ulcer. That is easy to say now after we have been using it for thirty odd years and begin to assess its value. Perhaps subtotal gastrectomy, which is becoming popular, and which does give more anacidity, and so far, better end results, may be assessed at the end of thirty years, and may then be even worse in end results, because we are only starting in on subtotal gastrectomy. If we look back to the time when gastroenterostomy was originally designed we get something in the way of a basic conception of ulcer. For instance, undoubtedly the first gastroenterostomies were done on the theory that if you could drain the gastric content out into the jejunum the gastric material would not pass over the ulcer. When Braun did his first gastroenterostomy that probably was

his conception of gastroenterostomy, because at that time every surgeon said that we must always do the gastroenterostomy at the lowest point in the stomach so it would drain the best. Well, along came Blake and Cannon, working in the physiological laboratory at Harvard, to demonstrate that gastroenterostomy did not do what it promised to do. This proves the real basis, I think, of all indirect operative procedures to relieve peptic ulcers. They said if you do a gastroenterostomy food does not drain out through the gastroenterostomy even on the patient. In an animal most of the food goes through the pylorus. In a patient, soon after you do a gastroenterostomy, the food goes through the pylorus. Therefore, the operation does not accomplish what it sets out to do. They didn't realize that that proves why the operation relieves these patients.

Just as Dr. Alvarez has said, a gastroenterostomy, an indirect operation, will cure a duodenal ulcer, or at least it will heal it temporarily or permanently without any direct attack on the ulcer. The reason it does is because there is alkaline pancreatic juice and duodenal contents regurgitated back into the stomach, which neutralizes its acid contents.

One of the functions of the pylorus, undoubtedly, is to contract and temporarily obstruct, so that the contents of the stomach can be mixed with the digestive juices and a certain amount of digestion take place, but also one of the functions of the pylorus is to relax and permit the alkaline duodenal contents to regurgitate into the stomach and help neutralize its acidity. There are certain surgical operations that prove the relationship of this fact to the formation of ulcer. If after doing a gastroenterostomy you obstruct the pylorus you increase the danger of gastrojejunal ulcer because duodenal contents cannot regurgitate back through the pylorus and so highly acid gastric juice is poured out into the duodenum. If you unite the two jejunal loops of a gastroenterostomy together with a lateral anastomosis so that the alkaline and duodenal contents do not go back into the stomach, but go into the jejunum, then you also increase the chances for jejunal ulcer. Furthermore, it has been definitely shown that the further away from the pylorus or jejunum you anastomose

the small intestine to the stomach, the higher percentage of gastric jejunal ulcers you get. That is, the lower down the jejunum the anastomosis is made.

All of these facts bring us back to the conception of high gastric acids and the effect of high unneutralized acids on areas that either do not naturally have protective influences or have lost their protective influences.

There are types of ulcers—and I must give you general information, as I say, as I cannot apply it to insurance—which are dangerous ulcers. The reason that the surgeon sees so many healed duodenal ulcers is that the ones that heal are visible. They are the anterior wall ulcers. The reason they heal is that being intraperitoneal they can invert themselves. We never invert an appendix stump, and people say that is wrong. I know it is not because I taught animal surgery, and one of the things I did to prove that you don't have to invert an appendix stump is, if you tie a piece of silk around a section of a dog's cecum, and if you will tie twelve sections of his cecum and tie a little piece of aluminum in with each one and put him in a metabolism case, you get them all back in his feces. He turns them in and they are discharged on the inside. Therefore, you don't have to turn them in; they turn themselves in. Have you ever seen an appendix stump sticking out? Never. That is the same situation with the anterior wall duodenal ulcers. The reason the posterior wall duodenal ulcers are bad risks is because they are the bleeding ulcers, and the reason the bleeding ulcers are bad risks is because they cannot invert themselves. They become indurated, calloused ulcers, and they are the ones that bleed because the posterior wall ulcers are the ones that invade the pancreatic duodenal arteries which produce the serious hemorrhages with duodenal ulcer.

Hemorrhage is an interesting complication of ulcer, and the bleeding ulcers are really bad risks, as Dr. Alvarez has so correctly said. Dr. Kiefer, in our Clinic, reviewed all the ulcer patients who had hemorrhage. Of the patients who had had one hemorrhage, forty per cent. failed on medical treatment. Of the patients who had had two or more hemorrhages, eighty per cent.

failed under medical treatment. Therefore, we too feel that these patients who come to us with a history of hemorrhages are the bad risk cases, and if they come with a history of repeated hemorrhage, they immediately become surgical.

There is a tendency to accept hemorrhage with complacency. It should never be accepted with complacency. One in every twenty who has bled while in the hospital has died in spite of anything we can do. You have to remember that there are two types of hemorrhage in connection with ulcer. (1) the intermittent hemorrhage, and (2) the progressive hemorrhage. If a patient has two massive hemorrhages in one day something serious is going to happen, and you must be prepared for trouble in spite of the fact that no one wants to operate on these cases close to a hemorrhage.

Duodenal ulcers, of course, are more common and also the percentage of hemorrhage is more common in our experience with them. Nineteen per cent. of our duodenal ulcers have bled as opposed to about eleven per cent. in our gastric ulcers. I think the gastrojejunal ulcers are even more apt to bleed than the duodenal or gastric ulcers.

If I had to have an ulcer, and if you would give me a period of three weeks' trial to make sure that it is not malignant, then I would select a gastric, and if you could let me locate it too, I would let it be on the lesser curvature, for two reasons. Our experience with the location of lesions in the stomach is of interest. For instance, if this represents the stomach (illustrating on blackboard), not a hundred per cent. but approximately a hundred per cent. of the greater curvature lesions will be malignant. If the lesion is on the greater curvature we don't even hesitate to advise surgery. The next dangerous place is in the prepyloric region. We don't agree entirely with Holmes and the Massachusetts General group who say, I think, that the prepyloric lesions on the gastric side are almost all malignant. But certainly that is a very dangerous area.

There is another point which will be of interest to insurance men and that is you can make more mistakes about prepyloric spasm in the diagnosis of malignancy than any other place in the

stomach. I have explored several patients with prepyloric spasm that looked exactly like carcinoma by X-ray, but who didn't have anything. Therefore, that is a point to look out for.

I think the posterior wall eroding gastric ulcers that have eroded into the pancreas are next in danger of malignancy, and the least likely to become malignant are the lesser curvature ulcers. The great thing about the lesser curvature ulcer is that you can watch it. Dr. Alvarez and all of us have established this plan of a trial of medical treatment and it has worked out well for us. If the lesion disappears completely, and I insist myself it must not only disappear but the flexibility in the wall must reappear, then you don't need to worry. If it doesn't disappear it doesn't make any difference whether it is an ulcer or not; it is either an intractable ulcer or a malignancy, and you have to do something. The best test of malignancy, as Dr. Alvarez has said, and it beats any pathologist in the world, is what happens to them afterwards.

I think probably the great trouble with most figures as relates to the incidence of malignancy in gastric ulcer is accuracy. I wouldn't have any doubt about Dr. Alvarez's figures because I know they are investigated carefully. What you have to discriminate between is, is this a lesion which is malignant and has ulcered, or is it an ulcer which has become malignant. I think the former is probably true in the majority of cases, but I can't avoid the fact, however, that there are certainly some ulcers that show malignant degeneration, particularly on their bases and upon their edges.

I do agree absolutely that everyone who deals with a gastric ulcer should feel obliged to prove that it is not malignant before he undertakes any non-operative measures.

Now, what are the end results in the treatment of ulcer? The end results are what we would like to have them. We all know the tendency for ulcer to recur. We know that the immediate results are good. I think Dr. Dublin may have quoted some of our statistics. In about two years they are somewhere around

eighty per cent., and in five years they decline to fifty-six per cent. good end results. Our surgical results at the end of five years are not quite as good; they are about forty-eight per cent., but that was before we undertook more radical operative measures.

I think I should say this: No one has been more radically opposed to the extensive operative procedures practiced in Europe (subtotal gastrectomy) than I have been, but I am becoming more and more convinced in the selected cases that they should be done. I have just sent home to Albany the type of boy Dr. Alvarez speaks of—a nice young medical student whose brother is a doctor, 22 or 23 years of age, with a high gastric acid and intense symptoms, who has failed under good medical treatment. I wouldn't dare to do a gastroenterostomy on that young man. There is something about chronicity that is a good thing in ulcer. The old ulcer that gets infiltrated, scarred and puckered is less liable to produce difficulties than the early ulcers, and that is why so many people later in life get on with their ulcer better than the younger ones do.

We do not operate over fifteen per cent. of our ulcer cases, and you will not see statistics such as Dr. Dublin has quoted ten years from now—that is with a predominating number surgically treated and a minority medically treated. You will see it reversed, I prophesy, that is a higher percentage of medical treatment and a lower percentage of surgical, and the only ones that will come to surgery will be the ones that are absolutely intractable, who can't get along with the chronic symptoms, who do have hemorrhage and obstruction, or perforation, or who have, in gastric ulcer, the question of malignancy. There is something that can be done about it all, I believe. I think there are two things that can be done. First, I think we have to admit this basic thing—that there has been a tendency in the past, and I stress this again and again, to operate on these patients, and to let the patient assume that because he has been through a serious surgical operation he is free to go out and do all the things that he did before, which produced his ulcer. The sur-

geons (I am one of them) have been a little proud of the fact, in the past, that "if you will take my risk you don't have to stop drinking, you don't have to stop smoking, and you don't have to stop eating unwisely". That is not true.

I have recently written in an article that if I send a patient out and permit him to think that, and he later develops a gastric jejunal ulcer, about which I hadn't warned him, the responsibility is mine. I think we have to start with the conception in these patients that they must alter their living, eating, smoking and drinking habits if they wish to give themselves the best chance of not getting a recurrent ulcer.

Now here is the other proposal which I think is an excellent one, and I do not know how to go about it, but we ought to do it. We do not possess the opportunity or the equipment to do it. You do. Perhaps you can't do it. I suggested it to Dr. Dublin. There are two types of ulcers: The acute or perhaps the embolic, that comes on quickly, with perforation or hemorrhage as the first sign. This is the so-called acute ulcer or erosion ulcer, which produces these bleeding ulcers, in which cases exploration does not reveal the bleeding point. They are the acute erosions that bleed, and in past years I have looked inside the stomach more than once and have been unable to find them. That ulcer we cannot do much about, but the majority are the chronic ulcers. There is a period, particularly in the duodenal ulcer, when there is a pylorospasm, when there is indigestion and hyperacidity, periodic, it is true, but many of these patients have had repeated warnings of the onset of ulcer and yet have not heeded them.

There is a tendency for doctor and patient to accept ulcer all too lightly, because so many of them get along with it for so many years and so few of them, relatively, have a mortality, and the others know about it and become impressed with it. A man says, "Oh, I have an ulcer, but that is not important. When the season comes for eating corn I won't eat corn, or I will take plenty of alkalis", and he gets along. I have a number of doctor friends who say to me, "I won't give up smoking for anything; I

would rather have the ulcer". That is wrong. I don't think we are dealing with those men properly.

If we can get before the public the fact that peptic ulcer is really a serious disease, that it can bring about serious things, not only from the point of view of mortality, but the effect it can have on one's life, it would be worth while. It would be worth while for these people if they could be taught to modify their lives when they first have symptoms, and if they did, many of them would not develop ulcers, if they could be gotten at the stage of the pylorospasm and the early hyperacidity. I think you all could do an excellent piece of work, a constructive, educational work throughout this country, if you could let people know that ulcer is not the simple thing that it is so often thought to be, that it has a real mortality associated with it and that it needs not a few alkalis but real modification of life habits, and if this is done a good many of them can be prevented from having ulcers, mortality and serious complications later in life.

I think that it will soon be possible, particularly in clinics like ours where we see these patients in follow-up quite regularly, to take these 190 gastric ulcers, for instance, and follow them and get some pretty accurate data as to malignancy, because, as we have said before, the best test as to the pathology in a patient with gastric ulcer is, does he die of cancer, and a follow-up of this group of cases should settle quite definitely what the real percentage of cancer in gastric ulcer is.

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Dr. Wells—With viewpoints such as these from two of the most eminent authorities on the medical and surgical treatment of gastric and duodenal ulcers I feel that from an underwriting standpoint our future action should be more logical and uniform. No doubt many of us would like to discuss these subjects further and perhaps ask Dr. Alvarez and Dr. Lahey some questions relative to these frequently occurring gastro-intestinal conditions. We will continue this subject after luncheon and will meet again at two o'clock, when Dr. Dublin will close the discussion.

AFTERNOON SESSION

DR. WELLS—I will now call upon Dr. Dublin for a conclusion of the discussion of his most interesting paper.

DR. DUBLIN—After hearing Dr. Lahey and Dr. Alvarez, it would be presumptuous for me to add anything. Indeed, I may say that during the preparation of this paper we felt that one of its best and most profitable uses was the opportunity it would afford us to have them speak to us. As usual, they have completely met our expectations. They have given us good advice and many worthwhile points for our every day problems with applicants reporting ulcer histories. What has especially impressed me, after hearing Dr. Lahey and Dr. Alvarez this morning, is that despite the admitted vagueness and inaccuracies of our insurance records, there is, nevertheless, a real body of truth in them. The end-results of our mortality study are in keeping with the rich clinical experiences of these two splendid physicians. They, of course, have a more definite picture of the end results of treatment for ulcer from their daily contacts with patients. We, on the other hand, often get a rather vague or nebulous appearance in our insurance records. Essentially, however, the two types of experiences, the clinical and insurance, fit perfectly well when it comes to the final result.

In conclusion, I want to say that the paper itself brings home the very great need for further study of insurance material on peptic ulcer. We are only too conscious of the limitations of our material because of the relatively small number of cases at our disposal. We feel that we need a much larger body of data, and I reiterate on this occasion what I have said to you gentlemen many times before, and which I shall continue to say as long as necessary, namely, a mechanism must be found by which the experiences of several companies that have many and good data can be pooled and analyzed with as much attention to details as each of us gives in studying his own material. The wholesale method of the Medico-Actuarial studies is not adequate for the purpose. How much better it would be if the experiences of half

a dozen or more companies with substantial numbers of cases could be assembled for investigations of this type. The reports would then have a much broader base and that real substance, which the experience of a single company, however large, cannot possibly have.

I do hope that with reference to gastric ulcer especially, where our material was least adequate, we can in the future bring together the records of the larger companies that have a policy similar to ours with respect to this impairment and to present a worthwhile study based on many times as much material as we have had. Thank you.

DR. WELLS—The next subject on the program is that of "Disability Insurance". This paper will be presented by Dr. Daniel W. Hoare, Assistant Medical Director of The Penn Mutual Life Insurance Company. Although the majority of companies have discontinued the writing of disability annuity very few of the companies have as yet recovered from their acceptance of this disability insurance. Dr. Hoare is eminently qualified to appear before you because of his long and intimate experience with the questions he will discuss.

# DISABILITY INSURANCE

By D. W. Hoare, M. D., Assistant Medical Director
*The Penn Mutual Life Insurance Company*

## The Guilds

Authentic evidence exists that the Roman collegia under the Empire made provision for befitting burials, but whether they extended mutual support to the more unfortunate members in case of accident and sickness is a disputed question and cannot be definitely determined.[1] During the Middle Ages, the influential trade guilds flourished in Europe. Interested students, who have sought to link these to the Roman guilds, have been unable to trace a continuity. "Phoenix-like they arose out of the ashes of her Empire when her distant provinces developed into industrial states in Modern Europe" * * * (Walter S. Nichols).[2] Just when the social guilds appeared in England, we do not know. They were an institution peculiar to that country, and their origin is lost in its early history. Brotherhood and charity characterized the guilds in general, and there were thousands of them; but those in England manifested to a greater degree the fraternalistic principles of friendship and of protection and relief in times of distress, whether caused by loss of health or property. It is not surprising to learn that they later found it necessary to limit their benefits to sickness and death. The guilds, which undoubtedly fulfilled a material function in their day and age, are milestones in an evolutionary social development.

## Friendly Societies

In England, the guilds were succeeded by the friendly societies, and in the latter we find the first systematic attempts to deal with disability. George F. Hardy[3] described them as "being originally purely social in character, subsequently charitable and mutually protective, and only in recent times financial". The First Friendly Society Act of 1793 referred to them as "societies of good fel-

lowship". This Act required their registration in order that they might obtain legal protection. In an act[4] passed in 1819, they are defined as "institutions whereby it is intended to provide by contribution, or the principle of mutual insurance, for the maintenance or assistance of the contributors thereto, their wives and children, in sickness, infancy, advanced age, widowhood, or any other natural state or contingency whereof the occurrence is susceptible of calculation by way of average".

Contributions, which were voluntary at first but later regularly assessed, necessarily demanded tables of disability likelihood. The first tables set up were calculated by the Rev. Dr. Richard Price and appended to a bill which later was passed as the First Friendly Society Act, referred to in the foregoing paragraph. Price, who possessed a brilliant mathematical mind and was a singularly gifted analyst, rendered a signal and far-reaching service through his enthusiastic and intensive studies and investigations of the fundamental principles of life insurance. Aside from the subject—but as a point of interest—Dr. Price was a friend of Benjamin Franklin and in sympathy with the cause of the American Colonies. After the Revolution, he was invited by the United States Government to come to America for the purpose of assisting Alexander Hamilton in the drafting of a constitution and the devising of a financial structure for the country. This invitation, however, was declined.[5]

That these societies were popular is attested by the fact that in 1801 an English economist[6] estimated there were over seven thousand clubs in England and Wales, with a total membership of between six and seven hundred thousand. W. H. Dawson[7] is the authority for the statement that in Germany in 1876 there were twelve thousand benefit societies, with a membership of two million. In regard to Germany, we must keep in mind that not only were there voluntary aid associations (hilfskassen), but that legislation passed in 1854 required dependent working people to join benefit societies.

### Accident Companies

Leaving the friendly societies, we shall turn our attention to a modern institution—the accident companies, which since their inception have gradually expanded and evolved into the great present-day business of the commercial health and accident companies. The first accident company was the Railway Passenger Assurance Company, which began business in England in 1848 and really owes its origin to the introduction of express trains, which brought about a rather alarming increase in accidents. A number of similar companies was projected at this time, but very few materialized.

Accident policies were issued at first only to the traveling public and provided only for a death benefit in the event of a fatal accident from any cause. Then followed the inclusion of benefits for permanent disability arising out of accident. "When all feasible benefits for accident policies had been covered by such contracts," commented William A. Hutcheson,[8] "the next advance was to provide 'limited sickness' insurance covering specific diseases." So in 1895 we find a company issuing an accident policy covering certain infectious diseases as typhoid and typhus fever. Each year saw a further expansion of the health insurance feature in accident policies, and in 1906 came the issue of the first accident policy without the familiar exclusions of specific diseases, etc., and actually insuring against all diseases and all accidents.

In America, accident insurance is regarded as dating from 1863, the year in which the Travelers Insurance Company secured the necessary legislation to underwrite accident insurance. It is true that a few accident companies had been formed prior to that time, some even as early as 1850, but their business was negligible and they had ceased to function.

The first health policy to be issued by an accident company in this country was in 1898 by the Fidelity and Casualty Company. In the following year, the Travelers and the Aetna also entered the health insurance field, and by 1903 sixteen of the twenty-three regular accident companies were issuing health and accident

policies. Accident insurance from the beginning proved profitable to the commercial companies of this country, but their experience with health insurance has not been favorable; in fact, so far as can be determined, the commercial companies now refuse to issue a health insurance policy excepting in combination with one providing accident coverage as well. The health policy is usually issued without medical examination and for a limited period, one year in most instances, and reserves to the company the privilege of cancelling the contract at any time or of refusing renewal upon expiration (without prejudice, however, to any claim originating previously to the date of cancellation or of refusal to renew). This privilege is a necessary contractural agreement to prevent a repetition of claims from individuals who are peculiarly susceptible to infection and illness and from dishonest persons who exaggerate and unduly extend the period of incapacity arising out of minor impairments. Usually, the contracts cover total disability from the first day of illness, although a few companies eliminate the first week or the first two weeks. Some contracts provide for full benefits only if the applicant is totally disabled and confined to the house and for 50% of the benefit if totally disabled but not confined; other policies provide in the event of partial disability for 50% of the benefit for a stated period, usually twenty-six weeks.

### Early Health Companies

About the time the earliest accident companies were being formed in America, other companies were organized to provide insurance protection against incapacity arising out of sickness.

In 1847 the Massachusetts Health Insurance Company was formed, and in the same year the Eagle Life Insurance Company was incorporated in Jersey City. In regard to the latter company, H. J. Messenger, in a paper entitled "Health Insurance in the United States," which he presented to the Fourth International Congress of Actuaries in New York in 1903, stated that it was the first company to recommend and adopt a system of rates based upon an intelligent and scientific investigation of facts. In

1848 the Health Insurance Company of Philadelphia and the Franklin Health Assurance Company of Massachusetts were authorized to transact business, and a year later the Spring Garden Health Insurance Company was started in Philadelphia.

Numerous companies were organized at this time, but they were not successful and did not long survive. Lack of training and experience was a severe handicap, and limited resources prevented their extension. The rates proved inadequate and the moral hazard too great. H. J. Messenger,[9] in the paper previously referred to, stated: "About the time the Eagle began, unchartered health associations were numerous throughout the country. They had all started within a few years and were based on the crudest ideas concerning their proper management * * *." Again he stated: "Throughout the fifty years following the first attempts to establish health insurance in this country, various companies, assessment and fraternal organizations, were started for the purpose of carrying on business of this kind. Not a single one was successful * * *. From 1855 to 1895, the various insurance papers contained from time to time references to health insurance companies; and the references, with two or three exceptions, are all alike—they simply chronicle the incompetence, dishonesty, failure, and death of the different organizations."

### Fraternal Societies

The part which the fraternal organizations have played in health insurance in America deserves comment. During the period from 1850 to 1900, they issued virtually all of the health insurance carried in this country, and it was to them that life insurance companies had to turn when it became necessary to construct "rate of disability" tables.

During the first half of the nineteenth century, the only health insurance available was provided by the various secret and benevolent societies. According to Dr. George G. McConnell[10]—"Between the time of the Revolution and the Civil War, some of the old English societies such as the Odd Fellows, Ancient Order of Hibernians, and the Ancient Order of Foresters had

been transplanted from Great Britain; and certain native societies like the Red Men, the Good Templars, the Sons of Temperance, and a number of others had come into existence, all of which afforded a measure of charitable relief to their members."

Modern American fraternalism dates from 1868, when the Ancient Order of United Workmen was founded at Meadville, Pennsylvania. This Order was the first to make the provision of a substantial death benefit a primary object. The subsequent growth of similar organizations was exceedingly rapid, and after 1876 a number of the societies incorporated benefits for sickness in their certificates.

The popularity enjoyed by the fraternals may be evaluated from the following report in the Fourth Annual Edition (1934) of "Statistics Fraternal Societies," published by the Fraternal Monitor.

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| Insurance in Force January 1, 1934 | $7,012,809,913 |
| Total Membership (including Juveniles) | 7,716,121 |

I cannot state as to the percentage of fraternal organizations underwriting disability coverage; but Mr. Arthur S. Hamilton, Secretary of the Fraternal Monitor, has very kindly furnished me with the following pertinent data:

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|---|---|
| Disability Benefits Paid by 89 Societies—1930— | $6,064,921 |
| Disability Benefits Paid by 81 Societies—1932— | 8,115,681 |
| Disability Benefits Paid by 80 Societies—1933— | 4,073,719 |

and estimates that the total amount paid by the societies in disability benefits would be in the neighborhood of $205,000,000.

The fraternals have provided for a limitation of their losses, a contractural agreement to that effect being incorporated in the certificates issued to their members. For instance, I am informed that one of these societies, whose membership certificate is for $1,000 death benefit, issues in conjunction a disability clause providing a payment of $5.00 a week for an annual limit of eight weeks' disability during the first and second years and, thereafter, $5.00 a week for an annual limit of five weeks' disability. It is also provided in this particular certificate that, in the event

of total and permanent disability, the claimant may exercise the option of discontinuing the certificate and accepting one-half of its face value or the cash reserve, whichever happens to be the greater.

### Life Insurance Companies

The first life insurance policy issued in America with provision for disability coverage was by the Fidelity Mutual Life Insurance Company in 1896. I am advised that whenever the disability clause was incorporated in a life insurance policy at that time an extra premium was imposed sufficient to mature the life contract as an endowment at age eighty-five. In the event of total and permanent disability, the policyholder could exercise either of the following options:

(1) "From the date of such proof, the premiums payable hereunder shall be discontinued or remitted and this policy shall thereafter be maintained subject to the conditions endorsed hereon from the equation reserve fund.

(2) "Such a Disability Life Annuity in exchange for this policy as its face value will purchase at the then age of the insured according to the Table of Disability Annuity rates endorsed hereon."

According to Dr. C. K. Knight[11]—within ten years after the adoption of this clause by the Fidelity, there were only seven companies writing disability insurance; but by the end of the next five years this number had increased to one hundred and fifty companies. Dr. Knight attributes the widespread introduction of the disability feature to its adoption by newly established companies as a means of securing business, pointing out that 78% of the companies issuing the clause January 1, 1912, had been organized subsequently to 1901.

In 1904 the Travelers Insurance Company adopted a disability clause which provided for waiver of premium only and, consequently, was less involved than the original one offered by the Fidelity Mutual Life Insurance Company. E. B. Morris,[12] of

the Travelers, stated that the Company carefully considered whether to issue the clause as a part of the life insurance policy or as a separate contract which could be assigned so as to provide for the protection of any life insurance policy in the event of disability. To quote Mr. Morris—"Had the Company's decision at that time been for the issuance of such an independent contract, it is clear, I think, that the history of non-cancellable health insurance in this country would have been very different."

In 1910, after some attention had been directed to the expediency of providing a periodic payment to the insured during disablement, the disability clause was liberalized to provide for the payment of the face amount of the policy in twenty annual installments, with the balance of the insurance payable in one sum if death occurred before all the installments had been paid.

In 1913 the benefit was further increased by having the policy mature for its full face value upon approval of claim for total and permanent disability, the proceeds to be payable in installments over a period of twenty years. Subsequently, some companies made further modification by providing for the payment of proceeds over fifteen and ten-year periods. Still others, in addition to the installments certain, provided for a deferred life annuity. The practice of paying out the face of the policy in annual disbursements in the event of total and permanent disability proved unsatisfactory to policyholders and was not very popular with the companies as it ran counter to the basic principle of protection to dependents which life insurance is intended to serve.

In 1915 the Pacific Mutual Life Insurance Company brought out a non-cancellable health and accident insurance policy; and in 1916 the Penn Mutual Life Insurance Company introduced a disability clause providing in the event of total and permanent disability for an annual income equal to one-tenth of the face of the policy in addition to waiver of the premiums during the period of disability. This was a decided improvement over the former clauses because it left intact the sum insured to be payable at death. Shortly thereafter, the annual income was changed to a monthly income of $10.00 per thousand of insurance.

Controversy and claim disputes soon arose as to what constituted total and permanent disability. Although the companies were permitted to issue "total and permanent disability" insurance, the final interpretation of the terms "total" and "permanent" did not rest with them but with the courts of the various states. Naturally, the interpretations of the different companies were marked by discrepancies, while the courts were inclined to be liberal in their decisions. To secure some measure of uniformity of practice between companies and a criterion that would eliminate discrimination between claimants, it was determined in 1920 by the issuing companies, with the New York Life Insurance Company taking the lead, to embody in their disability contracts a provision for "presumption of permanency" after a waiting period, usually ninety days.

Modification and further liberalization of the disability clause followed when the Travelers Insurance Company introduced the feature of making benefits retroactive to the beginning of disability upon presumption of permanency; the Metropolitan Life Insurance Company adopted the procedure of paying benefits for disability which might occur after the expiration of an endowment period; the Mutual Life Insurance Company increased benefits in proportion to the duration of disability; and the Bankers Life of Iowa conceived a "Professional Men's Occupational Disability Clause".

There can be no doubt that, regardless of the motives behind these various clauses, the force of competition aided materially in the development and liberalization of disability coverage. The attractiveness of the disability clause as a sales argument cannot be discounted, for it naturally appealed to the prospect because for the first time he was able to vision possible returns during his own lifetime without impairing the necessary future protection for his dependents.

## Recent Restrictions and Discontinuances of Disability Insurance

The last occasion upon which a paper on disability insurance was presented before this Association was in 1927 by Dr. W. W.

Beckett in his Presidential Address. At that time, virtually all the leading companies were writing disability insurance and fully expected to continue. In the eight years that have gone by, however, there has been a decided and definite change of attitude on the part of the companies. What has brought about this change in attitude?

In 1926 there was a joint actuarial investigation of the disability experience of American and Canadian companies. The Committee, in setting forth its findings, noted—"On account of the short experience among policies carrying total and permanent disability benefits, and particularly in the case of disabled lives of the paucity of data, the results of this investigation are somewhat inconclusive."

By 1929 increasing annual losses on disability insurance clearly pointed to an unfavorable trend, and a feeling of uneasiness began to manifest itself. Lack of uniformity in the disability clauses was one of the more evident difficulties, and in an effort to improve the situation the Insurance Commissioners at a meeting in December, 1928, appointed a Committee to draft standard provisions for total and permanent disability insurance. The report of this Committee, which coöperated with a Committee of Actuaries appointed by the Superintendent of Insurance of the state of New York, was presented at the meeting of Insurance Commissioners in Toronto, Canada, September, 1929. The report, although not formally adopted by this Convention, was followed and acted upon by the Superintendent of Insurance of the state of New York, and on July 1, 1930, the standard disability clause became mandatory for the companies doing business in that state. The hope had been entertained that this constructive effort in behalf of a more conservative policy would prove beneficial, but the situation continued to be unsatisfactory and in the latter part of 1931 one company after another announced a radical change in the disability protection which it offered. The companies divided themselves into two groups—the first of which (comprising companies writing about sixty per cent. of the total yearly issue of new insurance) decided to eliminate the monthly income benefit and grant only waiver of premium. The companies in

the other group, with a few exceptions, decided to issue, in addition to waiver of premium, a modified monthly income benefit in which the waiting period was increased to six months, the monthly income reduced to five dollars per thousand, and the age limit before which disability must occur reduced from sixty to fifty-five. When we review the increasing annual losses sustained by the life insurance companies, the necessity for this change of policy becomes evident. Statements of the companies reporting to the New York State Insurance Department reveal the following annual aggregate loss on disability insurance for the years 1925 to 1934:

| | | |
|---|---|---|
| 1925— | $12,797,155 | |
| 1926— | 17,968,728 | |
| 1927— | 20,500,000 | (approximate) |
| 1928— | 18,000,000 | " |
| 1929— | 21,800,000 | " |
| 1930— | 47,700,000 | " |
| 1931— | 55,881,555 | |
| 1932— | 63,136,538 | |
| 1933— | 62,862,888 | |
| 1934— | 41,247,462 | |

The marked increase in the aggregate loss for the years 1930 to 1933 is due to the additional reserves set up by the various companies on both active and disabled policyholders. The New York Insurance Department, late in 1930, issued a ruling that "companies should accumulate over a period of a few years such additional reserves over and above Hunter's Table as appear sufficient in the light of best information available to take care of the liberal disability benefits accounted in the past". Such reserves are reflected in the aggregate loss figures noted above. There is some gratification in observing that there was approximately a thirty per cent. decrease in the total loss for 1934 as compared with 1933, indicating probably that the companies are succeeding in getting their disability reserves established upon an adequate basis.

The following figures, which were compiled from the experience of all life insurance companies, are quoted from a discussion

by Dr. H. W. Dingman before the Insurance Teachers Association in 1934:

| | Premiums Received for Disability Protection | Indemnities Paid | Additional Reserves Taken from Surplus |
|---|---|---|---|
| 1931 | $81,000,000 | $62,000,000 | $56,000,000 |
| 1932 | 80,000,000 | 80,000,000 | 70,000,000 |
| 1933 | 72,000,000 | 90,000,000 | 68,000,000 |

Dr. Dingman pointed out that these figures not only indicate the demand and the need for disability protection, but also reveal the inability of the companies in the past to supply the demand and meet this need without incurring heavy losses.

## Some Reasons for the Unfavorable Experience with Disability Insurance

For the past hundred years, since the establishment in 1835 of the New England Mutual Life Insurance Company, life underwriting experience in America has developed fairly accurate norms for the evaluation of risks. Selection may be far from perfect, but at least a degree of uniformity does characterize it and the mortality has been satisfactorily controlled. Wherein, therefore, lies our failure to underwrite disability coverage successfully? We shall seek the explanation in a consideration of the following factors:

1. Liberality in life underwriting
2. Over-insurance
3. Low premium rates
4. Depression era
5. Claims based only on subjective evidence
6. Fraudulent practices
7. Court decisions
8. Moral hazard.

### *Liberality in Life Underwriting*

I think we are all more or less in agreement that the underwriting of disability benefits had been exceedingly liberal, a conclusion which becomes more and more clearly apparent as we study our accumulated experience and view in retrospect the

practices of the companies. It has been aptly stated that disability insurance was conceded, rather than underwritten.

Too frequently, the qualifying standards which govern the issuance of life insurance have served also as a sufficient basis for the granting of the disability clauses. Experience with actual claims under payment, however, has directed our attention most forcibly to the fundamental difference between possible invalidity on the one hand and anticipated mortality on the other.

A tonsillectomy completed a few months, perhaps a year or so, preceding the date of application may have been dismissed by the underwriter as a commendable and precautionary measure; and certainly the assumption that the removal of tonsils, supposedly diseased, would not tend to shorten the life span is entirely justified. Subsequent investigation in the case, however, pursuant to a claim presented possibly for tuberculosis or arthritis, may reveal a history of pertinent symptomatology for which, in attempted alleviation, the humble and unoffending tonsils suffered annihilation and for which the company's treasury must sustain repeated subtractions.

True, a sprained back is sometimes a source of annoyance, but surely it is not to be regarded as an impairment which will curtail the individual's allotted span. Nevertheless, we all know that, in the case of a policyholder bearing the burden of annual premiums, it frequently becomes so serious as to interfere with the performance of the duties of his occupation.

In like manner, those of us who are still interested in disability underwriting entertain a different idea to-day than we did ten years ago regarding the significance of light weight, nervous indigestion and other vague gastric or intestinal symptomatology, elevated and borderline blood pressures supposedly resulting from nervousness upon examination, vacations taken by the tired business man, and the like.

As medical directors, a share of the responsibility for liberal underwriting against the hazards of morbidity and disablement devolves upon us, and we may be criticized for not having given to this interesting phase of insurance the serious study and

attention it merited. It should not have been necessary to await repetition of unfortunate claim experiences to realize that lack of detail in the medical histories of applicants had an important bearing. We should earlier have insisted upon, and demanded, adequate and more accurate reports from our examiners and should have educated them to the new task. Examiners as a whole are not careless and indifferent, but they cannot be expected to be clairvoyant and anticipate for us needs and requirements with which they have not been acquainted.

Having acknowledged our share as medical directors for the condition which has existed in the underwriting of disability experience, a proper responsibility may also be assigned to other executives of the companies. There were the heads of the underwriting departments who formulated the principles and general underwriting policies of the companies. Then there were those who advocated liberalization of the contract when it was not at all too clear as to just what the experience of the companies had been. It would appear, in view of the realization that the attempt of the life companies to write disability insurance was experimental and we were engaging in a business from which the commercial companies were withdrawing, that close scrutiny, supervision, and careful investigation of the actual claim experience were indicated. A great mass of important data was accumulating which could have been sifted and analyzed to the advantage of the underwriters. The writer does not refer to statistical data, but to other information in possession of the claim departments, such as the difficulty in assessing claims in which organic evidence of disablement was lacking—the tendency of certain groups to be claim-minded—the importance of claim experience of the individual—the persistency of claims for disabilities that are ordinarily looked upon as limited, temporary conditions; e.g., appendectomies, herniotomies, fractures of limbs, etc.—vacations taken by the tired business man under the guise of disablement. True, all this may have been known, but was it carefully studied and analyzed? A life insurance underwriting executive, in recently addressing a group of home office claim department representatives, remarked: "Why didn't you men * * * shout at us that

disability was not a matter of statistics, but of psychology and personal morals and earned income and economic prosperity? Why did you not tell us that, if you got out a policy with a two per cent. monthly disability instead of a one per cent., those physically and morally acceptable persons electing that policy would become disabled three times as fast as the others? * * * You knew all these things long before we did * * *"[13]

*Over Insurance*

The reduced and at times the tragic circumstances of dependents when the earning capacity of the breadwinner is arrested by sickness or accident clearly reveals the need for some degree of protection against this emergency. The attempt on the part of the companies to meet this need through disability insurance was a very laudable one, even though the development and extension of this feature may be attributed largely to competitive and commercial motives.

The old line companies were slow in entering this new field of business and at first proceeded cautiously; then advanced more confidently; and finally, in strenuous competition, carelessly permitted the buying public to impose upon them. Dr. W. W. Beckett,[14] in his Presidential Address before this Association in 1927, remarked—"Insurance is based on the value of the thing insured and the extent of the loss sustained. In the case of disability insurance, the thing insured is the policyholder's earning power." Yet, as we glance back over the past fifteen years, we observe that for a considerable period the companies complacently issued their limit of disability income (usually $250.00 a month) in many instances without knowing or inquiring as to what extent the applicant's income may already have been protected against loss through similar insurance in other companies.

In this regard, it may be interesting to note some of the warranties requested of an applicant by the Fidelity and Casualty Company when they began writing health insurance in 1898:

(h) "My income per week exceeds the gross amount of weekly indemnity under all policies carried by me.

(i) "I have no accident or health insurance issued by stock companies, assessment, or fraternal association, except as follows:

(j) "If during the period of this policy I take other accident or health insurance, I hereby agree to report same to this Company.

(k) "No application ever made by me for insurance has been declined, and no accident policy issued to me has been cancelled or renewal refused, except as herein stated.

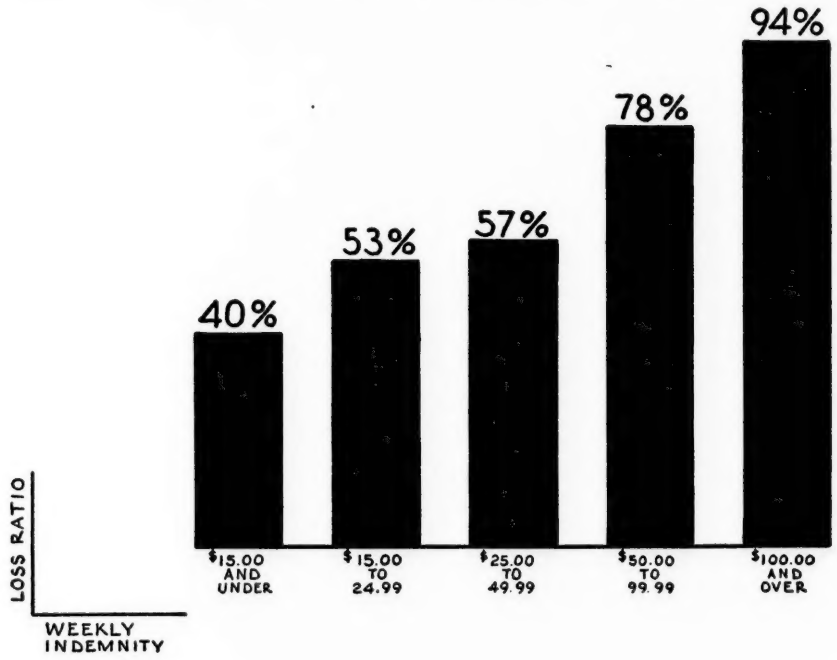
(l) "I have never received indemnity for any accident except as herein stated."

While an effort was made to relate the amount of disability insurance provided to the earned income, all too frequently the peak earnings of prosperous years were taken as a basis for calculation, rather than the level income. The basic fact that we were insuring individuals against the loss of earned income up to age sixty, it seems to me, was frequently lost sight of.

Fifty or seventy-five dollars a month will serve materially to tide over a family whose head had been earning two hundred dollars a month. Two hundred and fifty dollars is sufficient to keep the executive's family from want and take care of immediate needs. It is true that this income will not maintain for the family its previous scale of living, which entailed possibly a heavy expense incidence for social requirements, but this is not the purpose of disability insurance as I see it.

The Medico-Actuarial Study of 1929 directed attention to the increased hazard accompanying the issue of large amounts of life insurance on individual lives. An analogous hazard, even more marked, is noted when the amount of disability coverage is increased. The report of B. D. Flynn,[15] Chairman of the Committee of Five, which in 1921 reviewed the experience of sixteen health and accident companies, revealed a progressively rising loss ratio as indemnities were increased.

## DISABILITY LOSS RATIOS WITH INCREASING WEEKLY INDEMNITIES




(GRAPH BASED UPON INFORMATION IN REPORT OF 1921 BY S.D. FLYNN, CHAIRMAN OF COMMITTEE OF FIVE, ON EXPERIENCE OF 16 HEALTH & ACCIDENT COMPANIES.)

*Low Premium Rates*

A new endeavor, lacking the benefit of experience, must necessarily be developed upon a basis of trial and error. The difficulty which beset the companies from a standpoint of rates in their efforts to underwrite disability insurance is well expressed in the following observation made by Mr. Arthur Hunter in 1910.[16]

> "A company which desires to add the feature to its policies at the present time will find some difficulty in determining what the cost to it would be. The actuary will find considerable difference in the cost of the benefit under the various published tables. These consist of five:
>
> (1) Rates based upon certain German statistics (Karup and Zimmerman) and given by Mr. Jackson.
>
> (2) Mr. Jackson's tables, based upon the sickness experience of British friendly societies, eliminating the first two years of sickness.
>
> (3) Mr. Pipe's tables, based upon the experience of a Canadian fraternal society.
>
> (4) Messrs. Landis' and Eldridge's tables, based on the experience of the Order of the Maccabees.
>
> (5) Mr. Mead's tables, based on the experience of the Order of the Maccabees."

Mr. Hunter rejected the experience of the friendly societies, as well as the German statistics, as an unsuitable basis for American companies. In 1911, from his study of the experience of some of the fraternal organizations in this country, he developed his well-known table presented in that year. The table was generally accepted and was extremely valuable to the life insurance companies; however, the rates proved to be inadequate with subsequent liberalization and it is now evident that they were continued in use too long and that the companies had been selling a valuable benefit too cheaply. The lack of a satisfactory body of experience upon which a suitable table might be formulated remains a problem to the present day. The short duration of the companies' experience and lack of homogeneity because of diversity of con-

tracts and variation in claim practices have hampered an effort to secure a worthwhile experience.

The question of premium rates per se, important a factor as it is, does not provide, however, the whole solution to the problem of disability insurance. After all, it is not practicable to raise the cost above a certain level, as a rising cost curve inevitably results in deterring the better risks from applying and increasing adverse selection since only those risks who hope to profit would be inclined to apply.

*Depression Era*

In 1923 J. R. Leal, Chairman of the Southern Industrial Insurers Conference, pointed out the relationship between volume of disability claims and prevailing economic conditions, as data he had studied revealed a diminishing ratio during prosperous years, while business depressions, accompanied by economic disturbances and widespread unemployment, were attended by a marked increase in the claims presented. That this deduction has been amply tested and fully corroborated during the past five years of depression has been the sad experience of all companies.

With so many individuals who are unemployed and have no immediate outlook and in the meantime with dependents to be cared for, it is not at all surprising that there are those who would turn to their disability coverage in the hour of need. Not a few of those who have lost their positions or otherwise have become unemployed feel so keenly a resulting sense of embarrassment in their social and business contacts that, if they could but succeed in having the insurance company approve a claim for disability, it would furnish prima facie evidence to the outside world that would greatly relieve their inferiority complex. Others, it is true, who have sought by unswerving enumeration of subjective symptoms to persuade the companies to approve claims for disability were actuated solely by pecuniary motives. As a result, the companies have found themselves furnishing, in effect, unemployment insurance; and once such claims are approved, it becomes a most difficult problem to terminate them successfully.

*Claims Based Only on Subjective Evidence*

The companies expect to receive disability claims and anticipate the payment of claims, as this is an important phase of their business. No company hesitates to approve a bona fide claim. A policyholder who files proofs of disability (under a three months' clause) on account of pulmonary tuberculosis, who gives a definite clinical history corroborated by laboratory findings and roentgenological studies, and who is undergoing hospitalization, presents no problem at all to the claim department. This is true also of a claimant who has been unfortunate enough to have suffered an apoplectic attack with a definite hemiplegia. Not a day goes by, however, that we are not called upon to deal with claims in which there is no evident organic pathology and in which we have no alternative but to rely upon the claimant's statements supported by the attending physician. Into this class fall many of the claims based on angina, colitis, sacro-iliac disease, and neurasthenia; claims from individuals who belong to the neuro-circulatory-asthenic group; and claims from those policyholders who are inclined to be hypochrondiac. In attempting to determine the merit of these claims and equitably appraise them, we are disposed at times to throw up our hands in despair. The following is a typical case:

A farmer, age thirty-eight, made concurrent application to two well-known Eastern companies for a total of $20,000 of insurance with disability benefits. There was a history of "lumbago twelve years previously, occurring off and on for a year, no trouble since". Both companies approved, and the policies for $10,000 each were issued and placed in June, 1927. A year later, July, 1928, the policyholder presented proofs of claim, alleging that on December 6, 1927, he had sustained an injury to his back and had been unable to engage in any work since that time. After a thorough investigation, the claim was allowed, although there was no evident organic basis for the difficulty. Subsequent examinations at various intervals likewise failed to disclose any pathology; but the subjective symptoms presented, together with evidences of a decided neurosis, were sufficient to prevent the companies' mak-

ing any serious attempt to terminate the claim, although a tentative and unsuccessful effort to do so was made two years ago. More recently, investigations have led to the conviction that the claimant's activities are in no way compatible with his allegation of total disablement, and that even some of his relatives are of the opinion the claim is not being continued in good faith; and, consequently, the companies feel that there are justifiable grounds for resorting to litigation. For seven years, this policyholder has received $1,200 a year from each of the two companies and has had his premiums waived on insurance amounting to $20,000; and all during this period neither of the companies has been satisfied in regard to the merit of the claim. This is just one example of many which any insurance company issuing disability insurance could cite to illustrate the difficulty in connection with claims where disability may be simulated or even where, with well-intentioned people, it may be more mental than physical.

Not infrequently does it happen that the advice given by attending physicians will militate against the companies interested, making it difficult for them to handle claims in an equitable manner. The following is a case in point:

A broker, age forty-one, experienced a cardiac attack. Two physicians diagnosed coronary disease and advised immediate and permanent cessation of business activities. Within a month, a study by a cardiologist was made of the claimant's condition for the life insurance company. The claimant was sincere and desired an expression of opinion from the company's medical representative, who informed him it was his judgment after a careful review of the case that he could safely return to work, at least upon a modified basis. Between the two opinions, the claimant decided to spend the winter on the French Riviera and the following spring consulted an eminent internist in Rome, who reported that after a painstaking review of his case he could detect no abnormal findings and advised a return to work. Upon the claimant's arrival in America, his condition was once more studied by the cardiologist previously referred to and again with negative findings. Then fully reassured, the policyholder was entirely satisfied to return to

work, which he did two and a half years ago and has continued to date without any untoward developments.

*Fraudulent Practices*

Collusion among various groups of individuals in an attempt to defraud insurance companies is revealed from time to time. More recently, certain sections of the country have developed an unsavory reputation because of the unduly large proportion of disability claims originating therein. One large Eastern company had one hundred and two disability claims under group insurance filed against it in one day from a town of twenty thousand population.

The most outstanding attempt at fraud came to the attention of the companies about four years ago, when it was discovered that a large group of definitely impaired individuals in certain sections of the country had succeeded in securing a considerable volume of life insurance with disability provisions. These policyholders had undergone hospitalization for pulmonary tuberculosis and had been able to obtain the insurance only through connivance with agents and falsification of the facts. It is alleged that, in most instances, they had purposely modified the spelling of their names upon leaving the hospital, making it virtually impossible, when the frauds were discovered, to trace the hospital records. Nevertheless, the companies did succeed in recalling a large number of the policies and effecting cancellation.

*Decisions of the Courts*

Very soon after the life companies began to issue disability insurance, controversies arose over the important issue of what constitutes total and permanent disability. Although the companies generally did not insist upon a strictly literal interpretation of their contracts, nevertheless it was inevitable that there would be some cases in which the companies and the claimants could not agree and in which recourse to litigation and judicial interpretation could not be avoided.

The disability contract involves two fundamental assumptions—first, totality of disability; and secondly, permanency of disability. The problem of defining disability with reference to totality was not a new one, as the accident companies and fraternal organizations had previously encountered it. However, the life insurance companies introduced an additional problem when they stipulated that disability should be permanent as well as total. Since an assumption of permanency must rest upon medical judgment and it is quite impossible to determine in many disabilities whether they will be permanent or temporary, the adoption of a "presumption of permanency" clause cleared away many difficulties.

At first, the decisions of the courts were liberal; so liberal in fact that someone was led to remark that "the decisions made *for* the companies contracts never made *by* the companies".

The following three-fold classification of court decisions which were made up to 1924 upon the meaning of "total" disability was presented in that year by H. C. Bates,[17] Attorney for the Metropolitan Life Insurance Company, in an address before the American Life Association:

(1) Literal interpretation, where it was held there can be no recovery of benefits if the insured is physically able to follow any occupation whatever, regardless of how irrelevant to the one for which he may be fitted by training and experience.

(2) Liberal interpretation, holding that the claimant is entitled to disability benefits if he is unable to follow his own occupation or one of the same nature and equal remuneration.

(3) Reasonable interpretation, holding that the insured is entitled to recover benefits if he is unable to follow his own occupation or any occupation for which he is fitted by motive, ability, experience, or education.

The status existing at the present time was summed up last year by Berkely Cox,[18] Associate Counsel for the Aetna Life Insurance Company, in an address also delivered before the American Life Association:

(1) "An insured is permanently disabled in most jurisdictions only if the evidence shows the disability will probably be lifelong, unless the contract contains a clause as to 'presumptive' permanent disability.

(2) "An insured is totally disabled if he is unable to engage in substantially remunerative work. He may be so disabled even though he can do some work, if what he does is only occasional or inconsequential, or in some states, if he is unable to work in substantially the customary and usual manner. He may be so disabled even though he has worked more or less regularly during a period for which he claims benefits, if there is evidence that his working endangers his life or health.

(3) "In one or two states an insured is disabled from engaging in any occupation only if his physical condition is such that he cannot work regularly at any calling, whether or not he is otherwise qualified for the kind of work in which he can engage. In several states an insured is disabled from engaging in any occupation if this physical condition prevents his doing the work for which he is qualified when his age, education, and previous experience are taken into consideration along with his physical condition.

(4) "If there is conflicting evidence as to the existence of permanent total disability to engage in any occupation within the definitions of those terms adopted in the jurisdiction where the case is tried, it is for the jury to say whether such disability exists."

The Anticipatory Breach Doctrine for a time caused alarm among insurance companies. This Doctrine involves the legal principle that if a party to a contractural agreement repudiate the contract, the latter is void and the other party may sue for resulting damages. It was just ten years ago that the first case[19] claimed our attention.

The policyholder in the case, a woman, held an accident policy which provided for weekly indemnities to continue as long as total disability might exist because of accidental injuries sustained while a passenger on a common carrier. She was so injured; and the

company, after paying benefits for a year, discontinued them on the basis that disability had ceased to exist and sought to cancel the policy in accordance with the provisions of the contract. The plaintiff brought suit on the ground that the company had breached its contract. She affirmed that her disability was permanent and sued for weekly indemnity accruals based upon her life expectancy. The United States District Court for the state of Tennessee awarded her $21,000, and the judgment was affirmed in the United States Circuit Court of Appeals.

S. T. Gilmore,[20] addressing the International Claims Association in 1930, stated that the right to recover damages upon the doctrine that the contract had been repudiated when the company refused to pay accrued indemnities has been sustained in the state courts of Arkansas, New York, and Georgia, but that courts of other states have held that a denial of liability upon the ground that under the terms of the policy nothing was due the claimant is not repudiation of the contract and may not be used as basis for a suit of damages for the future installments.

John F. Handy,[21] Associate Counsel of the Massachusetts Life Insurance Company, in an address last year before the American Bar Association, observed that recent decisions in both state and federal courts show a trend against the extension of this doctrine.

The outcome of the case of Louis Robbins vs. Travelers Insurance Company[22] is being awaited with some interest. Robbins claims he became totally and permanently disabled January 10, 1932, for which he furnished due proofs. These were accepted and recognized by the Company, and monthly benefits were paid until October, 1933. On November 8, 1933, Robbins was notified that benefits were being discontinued because the Company did not consider him as being totally and permanently disabled at that time. Whereupon Robbins entered suit, alleging that he is no longer an insurable risk and seeking damages on the basis that the Company had repudiated its contractural obligation to pay disability benefits. His demand for damages is not only for the disability benefits already accrued up to the time action against the Company was commenced, but also for the present value of the contract "computed in accordance with the allegation concern-

ing claimant's expectancy of life". A motion on the part of the defendant to have the complaint dismissed and to vacate the attachment obtained by plaintiff against defendant's property was denied in the trial court. In an appeal, the higher court has affirmed the decision of the lower court, but the amount of the attachment was materially reduced, indicating that the higher court was of the opinion the defendant is not entitled to damages under the Anticipatory Breach Doctrine.

*Moral Hazard*

Important as may be the part played by too liberal underwriting in deterring some companies from further participation in disability insurance and causing the remainder to modify their procedures, important as over-insurance and liberal court decisions may have been, none of these outweighs moral hazard, which is certainly the greatest obstacle to successful disability underwriting. What is moral hazard? A comprehensive definition eludes us. It includes, among other things, a lack of good faith on the part of the applicant, the question of habits, personal morals, reputation, character, and speculative hazard. It also includes, though does not necessarily connote, downright dishonesty. We encounter it unknowingly when, because of misrepresentation and falsification, we accept for disability annuity applicants who should not be entitled to it; and when we come to deal with the claims of these policyholders and others, it becomes evident in exaggeration and malingering.

Appraisal of the moral fibre of our applicants is more or less baffling. Predicated as it is upon a composite background of heredity, environment, and training, the companies have not succeeded in devising a means of obtaining the relevant information upon which an evaluation may be based. We should know how an applicant has reacted physically, mentally, and morally to stresses and strains in the past. As Dr. C. R. Henry[23] has aptly stated—"If he is devoted to his family, pays his grocery bills and house rent, keeps out of debt and strives in season and out to live

up to the responsibilities which he owes his family, we say, everything else being equal, that he is a good risk."

If we cannot appraise the moral hazard, we cannot underwrite it; and the only recourse, therefore, is in attempting to avoid it so far as possible. This necessitates agents of integrity, examiners who recognize the problem and will do their share in the presentation of available facts, careful and comprehensive inspections, and competent home office selection. It behooves us to know more about the moral and ethical standards of our applicants. We must ascertain an applicant's reputation for honesty and square-dealing; must learn whether he has taken undue advantage of situations in the past; whether he is scrupulous, etc., etc.

There must be an insistence upon details of insurance history and, in particular, of claim experience. During the last five years, one of the national reporting agencies has been of great assistance to life insurance companies in this respect. To cite a specific instance: Before a certain company had availed itself of this service, it approved an application for $25,000 with disability on the life of an insurance agent, age forty-three, and four years later was presented with a claim. Investigation at that time developed that the claimant had at various times in the past collected on eleven claims from health and accident companies; that one company had cancelled after approving four successive claims, two had cancelled after three claims had been presented, and two other health and accident companies had declined to issue insurance upon the risk. If the life insurance company, at the time it approved the case, had had access to the service mentioned above, it would have avoided this claim.

A horticulturist, age thirty-seven, applied for $10,000 new insurance to a company already carrying $18,000 on his life. The medical history was negative excepting for a slight attack of la grippe a month previously and an appendectomy twenty-four years prior. The applicant informed the examiner that on one occasion he had collected a small compensation from the Government because of "a mild mastoid operation". The physical examination revealed nothing abnormal, and the policy was issued and delivered. When several weeks later the company was requested

to issue an additional $10,000, it then made further investigations and, through the service referred to, received the astounding information that over the previous ten-year period the applicant had filed seventeen claims against an accident company, five of them being based upon cardiac symptomatology. It later developed that there had been a severe attack of acute endocarditis while the applicant had been in the Army, and that subsequently he had been troubled with attacks of paroxysmal tachycardia and had had a physical review by one of the leading cardiologists in the country. It so happens that the disability clause was not requested; but, if it had, it would doubtless have been granted if the company had not had the benefit of this very pertinent information from the service referred to. Needless to say, the application was declined, and the company requested a return of the policy that had already been delivered.

### The Handling of Claims

Whether the companies which decided after 1931 to carry on with a modified disability annuity provision will continue to do so remains to be seen. There are relatively few applicants to-day applying for this feature, which undoubtedly is explained by the higher cost of the benefit, the restricted provisions of the clause, and the careful underwriting now being practiced. At the moment, however, we are not concerned so much with the disability insurance that is to be underwritten in the future as we are with that which has already been accepted. Behind us lie fifteen years of active disability underwriting, and to-day the life insurance companies are confronted with thousands of active claims and with claim potentiality that has yet to express itself. The handling of these claims is one of our immediate problems.

The advent of disability insurance brought many new and material responsibilities to the claim departments of the life insurance companies. At the beginning, only a few of the larger companies had the field organizations and trained personnel adequate to cope with the manifold problems that were soon to develop. The remaining companies were greatly handicapped in

this respect and, as they have not since felt warranted in building up the required field organizations because of the comparatively small volume of business, have consequently been carrying on their disability claim work at a great disadvantage.

Yet this problem of properly dealing with claims and claimants is a most vital one and, in my opinion, constitutes the most forceful argument against the continuance of disability coverage by the life insurance companies. Life insurance as an institution unquestionably commands the respect of the public, and its prestige has been immeasurably strengthened during the present depression by the impregnable position which it has maintained amidst a scene of national economic chaos and financial upheaval. No policyholder to-day questions the good faith of the life insurance companies or entertains fear that his beneficiary will not collect the proceeds of his policy. This reputation is well-founded and well-deserved, and it is to be hoped that necessary activities in connection with future claim work will not mar the escutcheon.

Claims presented in the future will, as in the past, fall into the bona fide, fraudulent, and exaggerated groups. The majority of claims are bona fide, and their handling presents no problem. Those in the exaggerated and fraudulent classifications, however, must of necessity lead to dispute and not infrequently to litigation, with a consequent danger of the public's misunderstanding the facts and passing judgment unfairly against the companies for the supposedly illiberal treatment of their policyholders. The public is not in full possession of the facts and cannot be expected to realize that the companies, in refusing such claims, are merely performing their duty to the vast body of policyholders—and yet, because it is necessary for the companies to protest fraudulent claims, they expose themselves to the risk of thereby jeopardizing the public good will.

Laxity in the treatment of claims, unfairness, or recourse to questionable practices, cannot be condoned. It is a serious matter to reject or otherwise treat unfairly a claim for which the policyholder is honestly entitled to the benefits the company has contracted to provide; and this infrequently occurs. In fact, there is no doubt that, lest an injustice be done, the companies more often

incline to the side of liberality in dealing with disability claims. It goes without saying that the personnel of our claim departments must possess abundant tact and diplomacy and have an inherent sense of what is fair and equitable.

The validity of each claim must be established, the usually required proofs consisting of claimant's certificate, physician's certificate, inspection report, and if necessary a physical examination by one of the company's examiners. Once approved, the claim must be followed and investigated in an intelligent manner. Proofs of continuance are necessary at intervals, but bona fide claimants should not be unduly harassed for repeated proofs or subjected to unnecessary examination if reliable inspection reports substantiate the continuance of disability.

The medical department can be of material assistance to the claim officers in interpreting and appraising medical reports; in suggesting specialized examinations in individual cases and designating physicians for the examinations; and in coöperating wherever possible with attending physicians, medical advisers, etc., to bring about rehabilitation of a claimant's health.

The inspector's duties consist in carefully investigating the claimant's medical history and securing pertinent data relating to the disability upon which claim is based, and periodically he will be requested to inspect and report upon the progress of the claim. The value of an inspector's work, naturally, is commensurate with the degree of care and amount of effort that characterize his activities.

Where more than one company is involved and the disability coverage provided is similar, concerted action by the companies is desirable, as an embarrassing and unfortunate situation may result in the event of a discrepancy.

In questionable claims of a fraudulent or exaggerated nature, the ordinary routine examination by a company examiner is usually a waste of time and money. In these cases, the certificate of a well-trained internist or specialist, and more particularly if he has had experience in claim work, is well worth while, as such examinations have a definite psychological effect upon claimants and provide a feeling of mental relief to the claim manager.

Moreover, if litigation follows, these examinations carry more import than do examinations by the average examiner.

### Penn Mutual's Experience with the Larger Claims

In the previous discussion as to why the companies have failed to underwrite disability insurance on a profitable basis, over-insurance was mentioned. In this connection, the writer has reviewed active claims of the Penn Mutual Life Insurance Company on which the disability limit of $250.00 a month is being paid. The monthly disbursements for these claims approximate 20% of the payments being made for all claims, yet they represent only 4.1% of the total number of claims upon which the Company is paying.

In the causation of disability, heart disease is predominant, as will be observed from the following tabulation, and 33% of these cardiovascular claims are alleged to be due to coronary disease and hypertension.

CAUSES OF DISABILITY

| | |
|---|---|
| Heart | 40% |
| Disorders of Central Nervous System | 16% |
| Tuberculosis | 9% |
| Sacro-iliac Impairments | 8% |
| All Others | 27% |

Seventy-one per cent. of these claims are apparently made in good faith and present definite organic pathology. The remainder are in a doubtful class, but with sufficient corroborative evidence or subjective symptomatology to forestall any serious attempt on the part of the Company to discontinue the benefits.

In 39% of the claims, the Penn Mutual is the only company involved. In 20%, one other life insurance company is also paying disability; in 23%, two other life insurance companies are involved; and three other life insurance companies are participating in 18% of the cases. Health and accident insurance companies are involved in 24% of the cases.

The occupational distribution of the group is largely executive and professional, and many of the applicants at the time they

were insured had owned their own businesses. As nearly as can be determined, the earned income at the time of policy issue and at the beginning of disability was as follows:

EARNED INCOME

| At Time of Issue | | At Time of Disability |
|---|---|---|
| 10% of Group | Under $ 5,000 | 27% of Group |
| 39% " | $ 5,000— 10,000 | 35% " |
| 30% " | 10,000— 20,000 | 16% " |
| 8% " | 20,000— 30,000 | 10% " |
| 3% " | 30,000— 40,000 | 0% " |
| 10% " | 40,000— & over | 2% " |
| | | 10% " (Undetermined) |

The Penn Mutual alone has paid out approximately $500,000 to these claimants, and from all companies they are receiving an average annual disability income of $6,455.70. The distribution of the group according to the benefits being received is as follows:

DISTRIBUTION OF GROUP ACCORDING TO YEARLY BENEFITS BEING RECEIVED FROM ALL COMPANIES

| | | |
|---|---|---|
| 47% of Group Are Receiving..... | under $ 5,000 Yearly | |
| 16% " | .....$ 5,000— 7,500 | " |
| 19% " | ..... 7,500— 10,000 | " |
| 14% " | ..... 10,000— 15,000 | " |
| 4% " | ..... 15,000— & over | " |

The average interval from the date on which insurance was issued to the date of disability in these cases was 3.1 years; and the Penn Mutual has now been paying on the claims for an average of 3.4 years.

In the face of an average disability income of $6,455.70 a year, it is evident that there is little hope of the companies' being able to terminate these claims. The claim of longest duration (twelve years) is based on a neurosis resulting from a fracture of the skull. The Penn Mutual has been paying an insurance salesman $3,000 annually for the past ten years on account of pulmonary tuberculosis. Two of the claimants have each been receiving from all companies a total of $7,800 annually for the past eight years (one of these, at the beginning of his disability for traumatic psychosis held accident policies providing for $7,200 annually).

Another claimant, a fur merchant, age 45, applied in 1923 for a line of insurance in several companies, including the one with

which I am associated. The exact height and scale weight were reported to us as 5 ft. 7 in.—180 pounds. Because we had reason to believe that five years previously his weight had been 216 pounds, we investigated through the companies that were interested and also wrote to our examiner. The companies replied that they had no unfavorable information and were issuing. Our examiner wrote that he believed the weight to be correct and had been advised by friends who knew the applicant that his appearance and physique had remained unchanged for some years In December, 1927, this policyholder made claim for disability benefits, stating he was totally disabled because of diabetes and a general nervous breakdown; and since that date the life insurance companies have been paying him $12,000 in aggregate benefits annually.

The president of an engraving company, age 43, applied in August, 1929, for $25,000 life insurance and $250.00 a month disability. The examiner's report on the physical examination was excellent; and the medical history was satisfactory excepting for an apparently harmless X-ray of his teeth one year previously. Thus, his application was approved. When in May, 1932, we were presented with a claim based upon arthritis deformans, it then developed that there had been an X-ray study of the teeth in January, 1928, and again in March, 1928; but that, alas, his physician had died in the meantime and the roentgenologist could not recall why the claimant had been referred for X-ray study. This case is illustrative of many claims we all have met and drives home the fact that, in the consideration of application for disability clause, no part of the medical history can go unchallenged.

What would be the action to-day if a group of applicants similar to those reviewed were presented for disability coverage? Only 25% of them would be approved. Thirty-three per cent. would be declined because of medical history or physical findings; 16% would be declined on account of the total disability coverage already carried; and 12% for various other causes, including occupation, past habits, claim experiences, etc. (making a total of 61% who would be declined). Twelve per cent. of the group would fall into a questionable classification on which final action

would await careful investigation of all factors. If the business offered to us by other than our own full-time agents were to be ruled out, only 14% of the applicants would qualify unconditionally. Since these cases were accepted, we have gained valuable experience and have learned, as all companies have, to distinguish some of the danger signals in the underwriting of disability insurance.

### Causes of Disability in the More Permanent Claims

For some years the companies have been underwriting disability insurance upon a presumption of permanency after a waiting period of usually three months. A large proportion of the claims are more or less of a temporary nature and are terminated after varying periods. With the thought that it might be interesting to study the causation of disability with reference to the claims on which benefits had been paid for a period of five years or longer, a survey of this group (composed approximately of 25% of the total active claims of the Company) was made in June, 1932.

The following classification obtained:

CAUSES OF DISABILITY

| | |
|---|---|
| Diseases of Central Nervous System | 40% |
| Tuberculosis | 28% |
| Heart Impairments | 10% |
| Disability Resulting from Accident | 5% |
| All Others | 17% |

An analysis of the claims based upon diseases of the central nervous system revealed the rather surprising proportion of 17.7% for definite encephalitis lethargica and 4% where this condition was suspected because of Parkinson's syndrome. 24% were dementia præcox cases; 5% were for epilepsy; and 8% were cases of cerebro-spinal syphilis. The average interval between the date of issue and the beginning of disability for this particular disease group was 3.8 years; and the duration of disability averaged 6 years.

The claims resulting from tuberculosis showed an average of 3 years between date of issue and date of disability; and the duration of disability averaged 6.5 years.

In the cardiovascular group, 52% were hypertension claims and only 6% were based on coronary disease of the heart. Cardiologists tell us that patients with anginal symptoms do not ordidinarily live beyond two and a half to four years after the definite onset of symptoms, which would seem to be borne out by our experience, indicating an average duration of disability of 6.6 years. The average lapse of time from date of issue was 5.1 years.

In the miscellaneous group, 33% of the claims were based upon arthritis and rheumatism and 14% were caused by sacro-iliac disease and spondylitis. Five years was the average period intervening from date of issue and 7.7 years was the average duration of disability.

A grouping of the claims as to the age at which disability occurred indicated, as we should expect, a preponderance of claims for diseases of the cardiovascular system between the fiftieth and sixtieth years of life; of claims for tuberculosis between the ages of twenty to forty; and that claims for diseases of the central nervous system occurred with regularity up to the fiftieth year.

AGE AT TIME OF DISABILITY
AS RELATED TO NATURE OF IMPAIRMENT

| Age Group | Heart | Tuberculosis | Central Nervous System | Others |
|---|---|---|---|---|
| 20-29 | 9% | 34% | 27% | 15% |
| 30-39 | 17% | 34% | 30% | 28% |
| 40-49 | 26% | 27% | 30% | 26% |
| 50-59 | 48% | 5% | 13% | 31% |

During the period from July 1, 1932, to January, 1935, 13% of these claims were terminated by death, 9% upon recovery, and 3% upon maturity of endowment policies.

### Claims of Cardiac and Circulatory Origin

In September, 1933, the Penn Mutual Life Insurance Company reviewed its active claims based upon diseases of the heart and

circulatory system, for the purpose of ascertaining whether the disability claim ratio from this source was increasing. In 1928, approximately 10% of the Company's disability claims were based upon cardiovascular impairments, and the more recent study disclosed 14.4% belonging to this group.

Analysis of the claims revealed that 31.1% were due to alleged coronary disease (designated as Group 1 in graph reproduced below), and on these we had been paying at that time for an average of 3.8 years. The average time between date of last issue and onset of disability was 7.4 years. However, during the fifteen months intervening between the date of the analysis and the present writing, 11.1% of the claims had been terminated by death and 4.7% upon recovery, which brought the duration of disability for the remainder of the coronary group up to an average of five years and one month. This is a longer period of disablement than data developed from clinical studies would lead us to anticipate, and the explanation is probably to be found in a dilution of the group by some claims not out-and-out coronary cases.

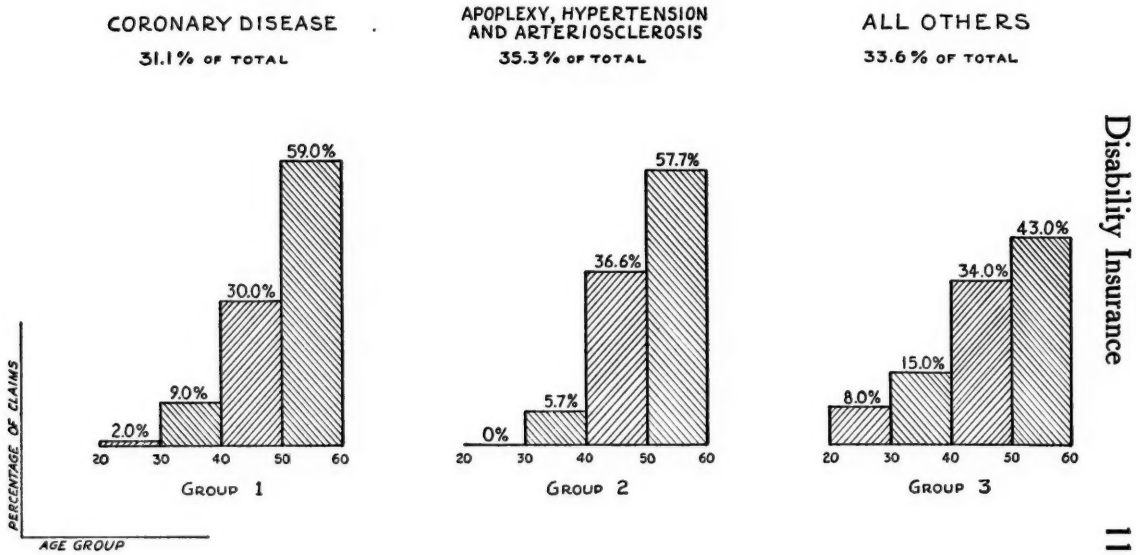
Apoplexy, hypertension, and arteriosclerosis (comprising Group 2) constituted 35.3% of the claims. The average time between issue and the beginning of disability was 8.2 years, and the Company had been paying monthly annuities for 4.2 years.

In Group 3 were 33.6% of the claims or those based upon all other cardiac and circulatory impairments. The average time between issue and the beginning of disability was 6.3 years; and the average duration of claims in this group was 4 years.

Between September, 1933 and January 1, 1935, 10.8% of the total claims were terminated by death and 8.9% through recovery.

The analysis revealed that 86% of the claimants had become disabled after age forty, and 52% after age fifty. The ages at disability of the various groups are set forth in the following chart.

## AGE DISTRIBUTION — CARDIOVASCULAR DISABILITY CLAIMS



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DR. WELLS—The discussion will be open by Mr. John M. Laird, Vice President of the Connecticut General Life Insurance Company, who, like Dr. Hoare, is a Canadian by birth, and who received his early life insurance training in Canada, but for the past twenty-five years has been with his present company. Mr. Laird was elected Actuary in 1917 and Vice President in 1927. He has other affiliations, such as a Fellowship in the Actuarial Society of America, the American Institute of Actuaries, the Casualty Actuarial Society of America, and is an Associate Member of the Institute of Actuaries of Great Britain.

MR. LAIRD—Dr. Wells and Members: Dr. Hoare has presented a comprehensive review of the rise and fall of disability benefits as an adjunct to life insurance. He has also discussed various other attempts to provide a suitable income in case of prolonged total disability.

If a man's earning power is cut off by serious injury or disease, usually his income is materially reduced, his savings are soon exhausted and, unless insurance benefits are available, he must be supported by others. For at least twenty-five years various types of insurance organization have tried to find a sound plan by which a man can pay a premium while in good health in order to secure a reasonable income during prolonged disability. Unfortunately, however, this apparently simple problem has not yet been solved.

*Workmen's Compensation* is directly related to loss of earnings and in some form is apparently here to stay. It may be extended to include occupational diseases, but in general it now covers only occupational accidents occurring during employment.

*Commercial Accident* has proven satisfactory to the companies and the public. Although most claims last only a few months or even weeks, it normally provides life indemnity for the man who, while still insurable, suffers such a severe accident that he is never able to work again. This coverage, however, is distinctly limited as only about 15% of the cases of prolonged total disability are due to accident.

*Commercial Health* has been unsatisfactory. The business is carefully selected at the outset and, under the company's right to cancel, is combed over each year thereafter. Claims are efficiently handled and payments are limited to fifty-two weeks of total disability. In spite of these safeguards, however, this form of insurance has been unprofitable and the volume in force is relatively small.

*Non-cancellable Accident and Health* has been issued by several large companies with experienced underwriters and well-organized claim departments. Even though premiums have been raised and the coverage curtailed from time to time, the experiment has in general been unsuccessful and has been largely abandoned.

*Permanent Total Disability with Life Insurance* has been the greatest and most costly experiment with this difficult problem. Losses have been caused by poor underwriting, over-insurance, inefficient claim work, enlarged benefits, inadequate premiums and the depression. The real trouble, however, is even more fundamental. In certain cases it is difficult to determine whether inability to work is due to sickness or to unemployment, old age or laziness. Sometimes the company and even the man himself cannot distinguish between inability to *work* and inability to *find a job* which looks better to him than a life income from an insurance company.

The difficulties are naturally greater in time of depression and under policies with the most liberal benefits, but they exist in every type of permanent total disability.

### What Is "Permanent"?

#### *(1) The "original" definition involving a forecast*

At the outset, "permanent" was used in the sense of irrecoverable or fatal, that is, necessarily terminating in death, and many policies now in force contain such a definition.

Unfortunately, however, when there is serious sickness, it is frequently difficult for even the experts to make an accurate prognosis on an individual. You all know of cases where the physi-

cians abandoned hope but the patient unexpectedly recovered. On the other hand, there are cases where they confidently expected recovery in a few weeks or months but some unforeseen complication developed and the life was lost.

Granted that we are able to distinguish a case of total disability when we see one, it is frequently impossible to tell in advance how long this condition will continue and whether it will end in death or recovery. Much depends on the nature of the disease, the kind of treatment, and the natural recuperative powers of the patient.

As an example, let us take tuberculosis. In some cases it requires the powers of the divine to determine whether this disability "will for life prevent the insured from pursuing any and all occupations for gain or profit." In case of disagreement, however, this problem is left to the insight of a jury.

Under such a clause some companies insist that payment be deferred six months or a year or two years to assist in ascertaining the ultimate outcome of the disease. Others feel that "this is a worthy case" or that it is cheaper in the long run to commence benefits at once rather than stir up trouble and perhaps ultimately stand suit. The net result is that all companies are forced to follow the lead of the most liberal company.

*(2) The present "standard" definition based solely on lapse of time*

Partly because of practical difficulties of determining in advance which claims would prove to be "permanent" and partly to appear more liberal in competition, about 1921 several companies began to use an entirely new definition; namely, that any total disability which has continued for a certain period, for instance, three months or six months, is "permanent".

At the end of this qualification period, if disability is still total, the policyholder is entitled to benefits and no questions are asked about how long the impairment or disease will probably continue or whether it will ultimately terminate in death or recovery. This definition frankly recognizes that in many claims it is impossible

to forecast the future. "Permanent" is used not in the sense of fatal or irrecoverable but merely as "prolonged".

In 1933 after the "standard provisions" had become effective and the depression acute, as part of the general movement to curtail coverage, this qualification period was practically standardized at six months.

### The Scope of Disability with Life Insurance

Some authorities think that life insurance companies should have adhered to the "original" definition of permanent even though it involved the difficult problem of trying to classify the claim in advance. In practice, however, after a man has been totally disabled six months, then regardless of the definition in his policy, it is extremely difficult to withhold benefits on the theory that he may eventually get well again.

At first it was apparently thought that total and permanent disability was a concrete condition of invalidism that would continue until death. This encouraged the view that the disability provision was merely an enlargement of the death benefit and that in the selection of risks there was no need to distinguish between the death hazard and the sickness hazard.

Accident and Health underwriters have consistently looked on any weekly or monthly payment as indemnity for loss of business time and have therefore kept the amount well within the actual and probable earnings. After the policy has been issued, they get a new inspection from time to time and if the earnings have fallen off, they have the right to cancel.

When disability income was introduced into life insurance, however, many companies unfortunately failed to realize that this income should be treated as indemnity for loss of earnings. They almost automatically awarded $10 with each $1,000 of life insurance. A man with earnings subject to wide fluctuations, for instance, a stock broker, could obtain disability income up to fully 60% of his maximum income in boom times. Similarly by simply splitting among four companies, an applicant for $100,000 could obtain $1,000 a month even though this figure might exceed his probable future earnings.

Life companies had the benefit of medical selection but the disadvantage of inexperience. Just about the time when companies writing Commercial Health abandoned their unprofitable attempt to grant life indemnity in case of prolonged sickness, the life companies obligingly entered this field in the name of Permanent Total Disability.

While the disability experience of life companies naturally varies somewhat according to the type of clause, the heaviest losses have been due not so much to short claims, which might be called temporary, but to prolonged illness, such as tuberculosis, insanity and allied nervous diseases, heart trouble, and arthritis. General results on disability *income* have been so unfavorable that many companies have entirely discontinued this benefit and now issue only waiver.

### New Insurance with Waiver

The waiver benefit as now issued is a logical part of life insurance, gives the buyer valuable protection, and is apparently satisfactory to the companies. It avoids some of the pitfalls of disability income but involves many underwriting and claim problems not found in life insurance alone.

The grand total of insurance with waiver obtainable in *all* companies should be limited but it is difficult to secure accurate information about the amount of waiver in other companies. As a partial solution therefore it is customary for each company to limit its own waiver to not more than $100,000 or some lower figure.

Certain types, even though eligible for standard life insurance, should be denied waiver because of underweight, race, nervous instability, or personal history of illness likely to recur. Furthermore, an applicant who has shown an excessive interest in disability income or in a large line of accident and health insurance should not be granted waiver.

Today in some companies the waiver is tested by the same medical standards as were formerly applied to the income benefit.

### New Insurance with Waiver and Income

Some companies offer a standardized benefit providing waiver and income of $5.00 per $1,000 after six months at premiums which, with careful underwriting and efficient claim work, should avoid loss. Although this clause is less liberal than what was offered a few years ago, it gives the public valuable protection not obtainable in any other way.

The popularity of the benefit with the field force has, however, waned and these companies are selling it on less than 5% of their business. In spite of the need for disability income and the sales appeal of complete coverage, their agents no longer feature the benefit.

This may be partly due to the shock of a few years ago when so many companies withdrew disability income entirely and the others cut the benefit in two. Furthermore, the agents now realize that many applicants who are eligible for life insurance will be declined for disability income and they probably hesitate to mention the disability benefit lest it be denied and the entire sale thereby spoiled. For various reasons they prefer on the whole to forget the disability income benefit and concentrate on the sale of life insurance itself.

Some Canadian companies have been issuing a benefit which on the Ordinary Life plan provides, after a six months' waiting period, waiver and income of $10.00 per $1,000 for 50 months, then $5.00 for 100 months, and at the end of that period pays the face of the policy in a lump sum. They are considering a possible revision to make the benefit less complicated and more attractive to the salesmen.

In the United States the companies which have withdrawn the income benefit appear thoroughly satisfied with waiver only. Those issuing the $5.00 income benefit show no desire to change the clause or to stimulate a wider spread by a sales campaign.

Unfortunately, if the company ignores the difference between life insurance and disability income, it is sure to lose money, and if it does distinguish, the disability benefit loses much of its value to the salesman.

### Reinstatements

An applicant for reinstatement may have an impairment which can be disregarded so far as life insurance is concerned but which makes him ineligible for the disability benefits incorporated in his original policy. Similarly, he may have an impairment which makes him ineligible for either life insurance or disability, but the policy is on extended insurance and therefore, although the disability coverage has ceased, the life insurance will remain in force several years. In either of such cases the company should decline the reinstatement in order to maintain its legal position, but it may subsequently, upon special request from the applicant, reinstate the life insurance portion without disability.

### Reserves

On policies issued in recent years the companies have charged higher disability premiums and adopted a more severe standard of reserves.

As Dr. Hoare points out, they have also been setting up additional reserves on policies issued before the new basis was adopted. This is a distinct improvement but on this old business in some companies even the higher reserves now held, plus future premiums collected and interest earned may not equal the future claims. In some cases, therefore, the disability business now on the books may continue to show a loss for several years.

### Claims

In life insurance practically every claim is clear-cut and promptly paid in full as a matter of routine. The policy itself is "incontestable" after one or two years. With minor exceptions, there is a tradition that the policyholder and the beneficiary are always right. Some companies would rather pay an occasional unjust claim than incur the trouble of a thorough investigation and the publicity of a lawsuit. The mere suggestion of a compromise is distasteful.

We all take pride in prompt payment of just claims and freedom from lawsuits, but we have found by experience that even

in life insurance, and still more in disability, a certain number of applicants and policyholders try to profit unfairly at the expense of a corporation.

The responsibility of the medical director does not end when the application is approved. He may at any time get a clue that the policy was secured by fraud or misrepresentation.

If this occurs during the contestable period, then, in fairness to honest policyholders, the company must make a thorough investigation. If there is any question about whether the policy would have been issued if all information had been available, the case should be studied by both the medical director and the underwriter. If there has been misrepresentation, the company should lift the policy and deny liability on any death or disability claim.

Under many contracts the incontestable clause specifically exempts disability benefits and therefore if fraud is discovered even after two years from date of issue, the company may be justified in denying a disability claim and lifting the policy or rewriting it as a contract with no disability benefits.

A few years ago the claim department in a typical life insurance company was chiefly concerned with the routine work of reading the proofs of death, comparing the date of birth, and drawing a check for the correct amount to the order of the right beneficiary.

Today the head of the claim department must know how to follow the slightest clue in order to uncover the real facts even though the search may take weeks or even months. He must also have the courage to face a dishonest claimant and to deny liability if the claim is invalid. If there is a reasonable doubt he should be sufficiently resourceful to effect a fair compromise. He needs many of the qualities of a detective, a horsetrader, and a judge.

A complicated disability claim, perhaps involving a compromise, requires coöperation by various departments—claim, medical, legal, and actuarial—but some individual should have the final responsibility for completing each case.

On any disability claim the company must look beyond the formal papers to determine whether the disability is total and, within the meaning of the policy, permanent. Even after the proofs have been approved, the claimant must be rechecked from

time to time to see whether payments should be continued. For this work the company needs an able medical and claim organization functioning at the Home Office and in the Field. These two departments, working in harmony, can accomplish more than either by itself.

Recently our company had 59 claimants drawing disability benefits in one section of the country. We had secured the usual proofs of continuing disability, including reports by family physicians, local examiners, and inspectors. We felt, however, that there might be some advantage in an intensive study of these cases in the Field. In order to get exact information and first-hand knowledge of this cross-section of our disability claims our Assistant Medical Director, Dr. Barker, and our Assistant Claim Manager, Mr. Day, visited 25 cities and towns and drove 1,900 miles by automobile. They made no appointments in advance as that might have given the claimants a chance to set the stage.

Five policyholders had already moved or were away from home at the time, but our men interviewed the remaining 54 claimants, of whom 4 had accident policies and 50 disability income with life insurance. These cases represented annual premium waiver of $25,000 and yearly income payments of $100,000—a total drain of $125,000 a year with claim reserve of over $600,000. Although 80% of these claimants had been laid up for more than a year and were considered chronic, the actual condition of the various persons interviewed varied from one who was at the point of death to another who was all set for his daily fishing trip.

The results of the interview and physical examination of the 50 policyholders with disability income on life insurance may be summarized as follows:

30 Totally and permanently disabled, of whom 25 need not be rechecked and of whom 2 have since died. These are worthy cases showing the social need for disability income.

3 On the way to recovery and expecting to resume work in a few months. The investigation undoubtedly shortened the period of payment, as all submitted final affidavits within a few weeks.

4 Either malingering or actually working. Payments immediately discontinued.

1 Drawing benefits under a policy which had recently been reinstated by misrepresentation. Disability provisions immediately cancelled.

12 Problem cases where the man has some illness but is not totally and permanently disabled within the meaning of the policy. In 3 we have denied liability but the policyholder is not yet satisfied. In 5 we have made compromise settlements, usually at the suggestion of the insured, who is perhaps partially disabled but realizes that he could work if the times were more favorable and a suitable type of employment could be found. In 2 we are continuing the investigation, and in 2 have suggested a program of rehabilitation during which we are willing to continue full payment for a limited period.

The trip has already more than paid for itself in concrete savings and in addition we obtained valuable general information from first-hand review of the claim situation. The policyholder's doctor was interviewed wherever possible and contact was made with practicing physicians and specialists who can be depended on to give reliable reports in future claims.

These cases illustrate some of the difficulties pointed out by Dr. Hoare:

1. There is a growing tendency on the part of the medical profession to regard certain impairments as constituting total disability and to advise their patients to take a prolonged and complete rest, although if there were no disability income many of these patients would continue to work in spite of a physical handicap.

2. Many claimants are over Age 50, have been unemployed for several years, and under present conditions probably could not obtain suitable employment. Their disability income exceeds what they could earn even if they got a job.

They see others with minor impairments living on insurance companies and feel that there is no stigma in retiring at the company's expense.

Several have moved to a village where they can live on a small monthly allowance and where it is difficult and expensive for us to make periodic check-ups.

3. It is frequently impossible to classify a claim by merely reading the formal papers submitted as proof. The family physician may be of mediocre ability and may not even prescribe the right treatment but nevertheless he has the confidence of the claimant. Too often his report is merely a repetition of the symptoms complained of by the patient rather than his own actual findings and diagnosis. He is not familiar with the terms of the policy and may keep the patient coming for treatment because he receives a fee for each visit or because he sympathizes with his client and sees no reason for cutting off his income from the insurance company.

To offset these difficulties every company should endeavor to build up a list of recognized specialists in their various lines in the important centers where there are a large number of disability claimants. The added expense of using these men in doubtful cases will be repaid many times by the authoritative information not obtainable through the average family doctor or even company examiner. The opinion of a specialist who stands at the top of his profession in the community carries weight not only with the claimant but also with the family doctor.

On an important problem case a medical director should go into the field to see the claimant and talk things over with the attending physician. By a frank discussion of the company's attitude and an explanation of the policy terms he may secure the coöperation of the physician, perhaps suggest different treatment, and hasten recovery.

In special cases usually more progress can be made if only one company is interested. Where two or three companies are involved, if one company makes an inadequate investigation or refuses to participate in a program of rehabilitation, the constructive work of the others is hampered.

As an example, one of our claimants wanted to start poultry and truck farming. We were willing to continue disability payments for a few months while he was getting under way. It

happened, however, that he was also drawing disability income from another company which threatened immediate withdrawal of benefits if he should try to work but promised to keep on paying if he continued to spend his time fishing. Under such conditions the claimant is afraid to try to work for fear he will be unsuccessful and have to face another waiting period of three months or possibly longer before his claim will again be recognized. Here is an opportunity for the two companies to save money and help the man by departing from their regular routine for a few months in order to get him re-established in business. In the handling of disability claims coöperation between companies is essential.

### Social Security

The Federal Government has promised the nation "social security." It has inaugurated a plan "to pension the aged, and aid the sick, the idle and the blind." Public health insurance is already mentioned as the next step. If the Government should enlarge its program to provide benefits for total and permanent disability, it will have the advantage that it can make the coverage automatic for all classes and it can always fall back on the power to tax. In the administration of such benefits, however, it will undoubtedly encounter in exaggerated form all the difficulties from which the insurance companies have already suffered.

### The Outlook

After twenty-five years of experiment under disability with life insurance the situation has become relatively stabilized. Disability income is still available in certain companies for the eligible man who particularly wants it, but the total volume now being issued is insignificant. The valuable waiver benefit is sold on probably 60% of the business.

Underwriters now distinguish between life insurance and disability. Most companies have made distinct progress in the technique of handling claims.

Possibly after the business now on the books has become more mature and the nation has emerged from the depression, the

actual experience of a number of companies will be combined and tabulated. In the meantime it is to be hoped that there will be no radical change in type of benefit or premium rates.

DR. WELLS—The Penn Mutual Life Insurance Company is to be congratulated in having as its Counsel, Mr. Robert Dechert, who, in addition to his association with The Penn Mutual, is on the faculty of the University of Pennsylvania Law School. As many of you know, Mr. Dechert is a member of one of Philadelphia's outstanding law firms, and we have asked him to discuss primarily the legal aspect of our disability problem.

MR. DECHERT—Dr. Wells and Members: When I was invited to take part in the discussion of the paper on the subject of "Disability Insurance" by Dr. Hoare, I had some doubt about the propriety of my accepting, in view of our association with the same Insurance Company. An instant's reflection, however, brought me to the conclusion that I should gladly accept the invitation, because of the opportunity which it would bring to me,—not only to say something about Dr. Hoare's paper itself,—but more especially, as a lawyer (both as an official of a company and as a lawyer in general practice) to speak of the high position of the Insurance Company medical man in the insurance world.

It seems to me that this is properly within the field granted to me, for this matter of Disability Insurance is no subject of cold figures or mathematical formulæ. In it is an element which escapes the actuarial table.—Some years ago I was discussing the possibility of obtaining insurance against the possibility that a widow might remarry, and it was pointed out that experience tables were available to show the proportion of widows who have remarried in the past. One man, however, spoke up:—"Those tables are no use here, for they leave out of consideration the fact that this widow won't sit quiet to await the result of the experience tables, but will be out there trying all the time!"

The personal equation—the human element,—is the chief factor in Disability Insurance, as Dr. Hoare has demonstrated,—

both in the underwriting of the insurance at its inception and in the settlement of the policy when it becomes a claim. The doctor who advises the underwriter at the start or the claim man later on must be much more than merely a capable medical man, or he will miss those imponderables which Dr. Hoare has pointed out. He must be a wise judge of men and have a knowledge of human nature as its reacts in varying circumstances. To the high character and keen insight of its various medical directors does the institution of life insurance owe much of its position in American life. And the author of the paper now under consideration, Dr. "Dan" Hoare, among all who know him, year in and year out, typifies the wise, quiet and firm medical man whose common sense and sound judgment, coupled with his professional knowledge, makes easier the path of all of us in other branches of the life insurance world. My hat is off to all you medical directors!

In this paper, Dr. Hoare has traced in most interesting fashion the development of disability coverage from the early days of the Guilds to the time when the life companies seized on it so eagerly as an adjunct of the life policy. In reviewing this, I wondered if Dr. Hoare had laid sufficient stress upon the part which the United States Government's War Risk policy issued to men in service during the War played in spurring the public demand for disability insurance. Just as the Liberty Bond sales introduced the investment field to vast numbers of citizens (some writers even claiming that it was one of the factors contributing to the subsequent stock trading of the Boom days by such people as bootblacks and manicurists), so millions of soldiers and sailors in the War had brought home to them (mostly for the first time) the usefulness of disability coverage,—particularly a coverage not affected by advance against enemy shellfire.

Of course the war risk disability coverage was of the kind which caused the policy immediately to mature, for payment in installments during disability. There was no question here of a claim for "total and permanent disability" of the "off-again, on-again" type with which we have become so familiar under the later kinds of policies. It seems to me that in spite of the fact that the disability coverage in the War Risk type of contracts does

"run counter to the basic principle of protection to dependents", as Dr. Hoare points out, it serves as such a useful brake on "selection against the company" in the matter of disability claims (to put it mildly) that we may well wonder why we ever went beyond that point.

Dr. Hoare in his paper has dealt with eight major factors leading to generally unsatisfactory results for life companies in the disability field. As a matter of fact, he implies that the result is due to our own lack of wisdom, in speaking of the result as "our failure to underwrite disability coverage successfully". And when we look into the record under his first two headings: "Liberality in Life Underwriting" (by which he means "Liberality in Disability Underwriting under Life Policies") and "Over-insurance", I think we all must admit flaws on our escutcheons.

Of course the points in his paper most directly affecting me as a lawyer are those relating to claim experience, both in court and out. The claims based only on subjective evidence, to which he referred, are those where we most need the sound judgment of the medical man as to whether the claim is *bona fide* or that of a malingerer; and if *bona fide,* what the outlook for the future is. I suppose in the class of honest claims we have all had experience with the sort of case which would have a good chance of recovery if the worry over the claim could be permanently removed. In many such cases an outright settlement of the entire liability under a disability clause for a single cash payment is sometimes the only means of preventing the claim dragging on endlessly, to the detriment of both the neurotic claimant and the company. Here the insurance doctor's judgment is a vital factor. But these settlements have to be handled with the greatest care, and ought not to be made except in cases of real doubt as to the permanence of the disability and the right of the claimant to benefits. Sometimes a claimant, who is beyond doubt permanently disabled, may seek a lump sum settlement in his own interest; but these should be outlawed just as much as buying up life policies of men no longer insurable. Both practices offer a chance to save money, but often to the detriment of the policyholder; and both invite future fraudulent claims. Only last winter I had to appear before

a Senate Committee in an Eastern State in connection with a proposal to bar *all* settlements of disability claims for a lump sum. The proponent of the measure claimed that it was necessary to prevent claimants from being cheated; and the Insurance Commissioner of the State, an old claim adjuster for a company writing workman's compensation, supported the bill, saying that he was convinced that the great majority of disability claims which he himself as an adjuster had settled on a lump sum basis had been against the true interests of the claimants, who must therefore be prevented by statute from being thus tempted.

The bill was not passed, since the Committee seemed to doubt the extent of the evil, and also recognized that the proposal barred lump sum settlements of honest disputes (where this type of settlement sometimes offers the only means of avoiding litigation). However, the hearing furnished an interesting sidelight on claim practices in disability matters.

In connection with the problem of the fraudulent claims, the current American Bar Association Journal (for October, 1935) contains an interesting address by Joe G. Sweet of the San Francisco Bar, delivered before the Insurance Law Section at the American Bar meeting last summer, on "The Motion Picture as a Fraud Detector". Mr. Sweet points out the discussion of the authorities supporting the admissibility of such pictures in the case of Boyarsky v. Zimmerman Corp., 270 N. Y. Supp. 135. He also cites some interesting examples of the effectiveness of such evidence to combat frauds. I assume many of us could give others from our own experience. For such evidence to be effective, however, it must be secured under the general supervision of the medical man (who knows what is needed), and it must be related to the claimant's history by a medical expert. So we all come back to you gentlemen once more.

In his section dealing with the effect of court decisions upon disability claim experience, Dr. Hoare has referred to the Anticipatory Breach Doctrine. Fortunately, the application of that doctrine (well established in the general field of contract law) to disability coverage under life policies has not shown a tendency to spread in the last few years, but we are not yet entirely out of

the woods. The United States Supreme Court in the recent case of Mobley v. New York Life Ins. Co., 55 Supreme Court Reporter 876, made it clear that the doctrine did not apply to the facts in that case (where the company in declining a claim expressed a willingness to accept any further proof which might be offered). However, the Court did not pass upon the question of whether the doctrine might not have applied under different facts. Until we have more definite decisions, it behooves us, in case of rejection of claims, to make very clear that the rejection is for lack of sufficient proof, rather than an absolute refusal to comply with the contract.

Dr. Hoare did not mention (I assume because it verged too far on the legal side of the matter) the experience of the several companies in securing rescission of disability clauses procured by fraud. In recent years, it has been generally believed that the exception of the disability provisions from the operation of the incontestability clause in the life policy left the avenue open to the companies to rescind a clause procured by fraud, even though such fraud is not discovered for more than two years after the policy (with the disability) was issued. The right to such rescission, even after the period of contestability, has been upheld in these cases, among others:

Penn Mutual v. Hartle, 166 Atl. 614 (Md. 1933),
New York Life v. Davis, 5 Fed. Supp. 316 (Pa. 1933),
Mutual Life v. Stroehmann, 6 Fed. Supp. 953 (Pa. 1934),
Greber v. Equitable Life, 28 Pac. (2d) 817 (Ariz. 1934),
Conn. Gen. v. Brandstein, 249 N. Y. Supp. 1018 (N. Y. 1931),
Kaffanges v. New York Life, 59 Fed. (2d) 475 (C.C. A. 1, 1932).

On the other hand, it has been held that the incontestability clause applies to the disability provisions as well as the life feature:

Ness v. Mutual Life, 70 Fed. (2d) 59 (Calif. 1934),
Kaufman v. New York Life, 78 Fed. (2d) 398 (Calif. 1935),
Thompson v. New York Life, 9 Fed. Supp. 248 (Okla. 1935),
Kiriakides v. Equitable Life, 177 S. E. 40 (S. C. 1934),

and at least one State (South Carolina, Act 377 Laws of S. C. 1935) has actually amended its incontestability clause to include

the disability feature. The chief reason for the incontestability clause in the life policy,—the fact that, in the absence of such clause, the contest is apt to arise when the insured is dead and unable to tell his side of the story,—is not present in the case of the disability clause. However, if the contest occurs when the insured is actually disabled (which is usually the first time the Company is able to discover the fraud), it is true that as a disabled claimant he is at a disadvantage in a contest with the company. Understandable legislative sentiment is apt to lead to a spread of legislation like that of North Carolina, it seems to me; although legislators ought to be made to realize that a prohibition against contests will play directly into the hands of cheaters, and by increasing claim payments, increase the cost of disability insurance for honest men. That this result follows is clear from the opinion of the Circuit Court of Appeals for the Ninth Circuit in the recent Kaufman case. There the court denied the right to rescind the disability clause because the life policy had become incontestable, but it admitted that it reached this result "despite the fact that it makes indefensible" (i. e., no longer available to the Company as a defense) "such grossly reprehensible fraud as Kaufman admits." (78 Fed. (2nd) at page 402).

There is no doubt about the fact that we are still in the experimental stages of disability insurance, in spite of the early beginnings of the idea which Dr. Hoare has traced. The need is unquestioned for insurance against the risk of becoming totally and permanently disabled. The desirability of the insurance being written in the future by companies whose major business is in the life field is open to serious controversy, for the reasons Dr. Hoare has suggested. The terms on which such insurance is to be written must be subjected to continuing scrutiny of medical directors, underwriters, claim men and all those in the insurance world.

Secretary Dr. E. G. Dewis took the Chair—

Dr. Dewis—Dr. McL. C. Wilson of the Travelers Insurance Company wishes to say a few words on this subject.

Dr. Wilson—It seems to me that the Medical Departments must assume a more active role in the handling of Disability Claims than they have in the past. We are dealing with people who are suffering from disease or serious injuries. Therefore the problem is medical and while it is necessary to use lay claim men and inspectors for the procuring of facts, we must not allow them to arrive at conclusions based upon their own observation and symptoms related to them by claimants. There is a tendency for the claim man, from his contact with cases and knowledge of medical terms, to get the impression that he knows quite a little medicine. We of the Medical Department must advise and direct the claim man in his investigation of disabilities. A given disease or a certain type of injury presents certain symptoms so that the individual's complaints, performances, and so forth should conform to the nature of his trouble. If the claim man reports signs and complaints that are inconsistent with the known cause of disability, such must be explained and it is only the medical man who has the training to determine such situations.

It is also important that the Medical Department direct the claim man as to the character of information desired in a given disability. For example, the neurasthenic, the cardio renal and the tubercular case, if ambulatory, differ widely in their activities so that the inspector is easily misled unless he has been advised as to what he may expect in the given case. It would seem advisable, in selected cases, that the inspector contact the attending physician and ascertain the program that has been laid down for the patient. He then will be in a position to know when seeing the claimant whether or not he is conforming to instruction, is running wild or laying down on the job of rehabilitation.

Let me again emphasize that the Medical Department must have a constant contact with the Claim Department and the claim files and see that investigations, examinations, controversies, and so forth are kept within medical reason.

We, however, as medical men must not confine ourselves solely to the medical phase of a case. The fact is that we often are able to visualize situations more clearly because of our knowledge of

the human being and his reactions than the layman, and therefore, must not hesitate to outline subjects for investigation.

Companies having branch offices or claim men situated in the larger cities should be visited at intervals and the files reviewed with the local claim men and instruction given where needed. We believe an educational program of this character is of great benefit.

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Examinations when requested should as a general rule come from the Medical Department. If an examination is requested of a regular Company examiner, it is important that he have full knowledge of the facts and our particular problem in the case. When possible he should be given an opportunity to read the file. When this cannot be done he should be written by the Medical Department setting forth the character of examination and special points that we desire cleared.

It is often also desirable in the problem cases that the examination be made with the attending physician present so that any question arising might be cleared. Special examinations are to be called for when question arises as to the diagnosis, where special laboratory work is required, where the continuing of disability is in doubt and suggestions as to treatment, and so forth. These special examinations are of undoubted value in selected cases, but it has been my observation that we are not using them to the greatest advantage. We must remember that the attending physician is the keyman in our claims and if we are to get anywhere we must show him that we are on the level and will coöperate in every way possible toward the recovery or rehabilitation of his patient. I, therefore believe, that in our problem cases we should invite him to be present at any special examination or at least give him a copy of the findings. Discussion with him then may follow which may be to our mutual advantage. There will a question arise as to the advisability of this procedure where litigation seems probable. However, such cases can be decided by the set-up of the given case. Personally I doubt that knowledge of our medical findings by the plaintiff's counsel would make

much difference as medical opinion would be submitted to a jury on a question of fact.

To again consider the question of the attending physician, we must realize that in the average case he does not analyze the monetary background and wish desires of his patient. It is also true that the physician makes less effort to rehabilitate those who are receiving adequate benefits for their complaints than those who are not indemnified and must get back to work in order to live. The psychology of the individual who has been disabled for a considerable period is a difficult problem to deal with and unless the attending physician will coöperate along rehabilitation lines, the outlook for recovery is indeed remote. I therefore wish to emphasize the fact that we have a lot of missionary work to do.

Dr. Rowley—I realize we are running overtime, but I am sure we would all like to hear just a word from Dr. Alvarez on this subject before it is closed.

Dr. Dewis—Pursuant to Dr. Rowley's request I will call upon you, Dr. Alvarez, to make a few remarks in connection with this subject.

Dr. Alvarez—I have such a decided interest in this problem as I see it from our side, and to my way of thinking, your big problem in disability insurance is almost my biggest problem. I wouldn't say that the things I see most of aren't described in the textbooks, but the one thing I do see most of is what I call constitutional inadequacy, which describes a type of people who are not built originally strong enough to stand the gaff of life. Sometimes you call them "weak sisters". I discussed them one day at a meeting somewhere and an old doctor came to me afterwards and said, "I will give you a name for those". He said when he was in the army there was a lieutenant in his company who kept putting P.M.S. in the place for the diagnosis, and finally the major called him on the carpet. He said, "Lieutenant, what do you mean by putting P.M.S. in here? Take the regulations here and show me where the initials P.M.S. stand for a

diagnosis recognized by the War Department". The lieutenant shifted around and scratched his head and said, "Major, about all I can say about a lot of these fellows is that they are 'poor miserable sons etcetera, etcetera' ".

That, gentlemen, is the difficulty experienced with about a third of the patients that I see. They come long distances expecting to be made over. They have these aches and pains, and if you relieve the ache in one place it goes to another. Perhaps I told you last year about the Irishman who was taking an examination for civil service here in New York to be a driver of an ambulance. They asked him a lot of fool medical questions, and one was, "What is rabies? What do you do for it?" His answer was, "Rabies is Jewish priests and there ain't nothing you can do about it". There are a lot of these people with whom nothing can be done. They are that way and will always be that way, and the Lord help you if you give disability insurance to any of them. What I fear is that there is nothing on your examination blank to show that the applicant is a P.M.S. His urine is all right, his heart and lungs are normal, and his weight is right, but just the same he is a poor weak sister who perhaps has had a hard time earning a living, and the first time he got a chance to go on any sort of a pension he went on it and stayed on it.

You say, "Why are these people P.M.S.'s? Why are they that way?" They are born that way. Why are they born that way? During the last five or ten years I have been studying that very very carefully, going in sometimes and talking to them for hours, and I will tell you why I believe many of them are that way. The worst type you can possibly lay hands on are the people with insane relatives. Look out for the relatives of the insane—never give them any disability insurance if you can help it. They are hard people to get along with, they are cantankerous, and they are like their relatives. You say they don't have relatives who are insane. No, but they have the sidelines, the equivalents of insanity, such as the fellow who drinks like a fish every so often, the old recluse, and the fellow who is such a crank that nobody can get along with him (they call him a politician sometimes), and also the fellow who preaches on street corners. They are all

in that group, so look out for such types when you get hold of them.

You were saying "get the practitioners to help you". I could help a decent fellow who I think would like to work if I could promise him that his disability wouldn't promptly be taken away from him the minute he starts working. I was tickled to death to hear that some of you were trying such a practice, and I think that that is the only way you will ever get rid of some of these claimants.

DR. DEWIS—Dr. Hoare will you kindly conclude the discussion of your paper?

DR. HOARE—Mr. Chairman: I wish to take this opportunity of thanking the President and his Committee for granting me the privilege of presenting before the Association a paper on disability insurance. It is true that, for the present at least, the period of active underwriting in this field has passed; but it is equally true that in its wake are many problems that today confront the interested companies. It was my thought that a review of the history and rapid development of disability insurance, as well as the present status of disfavor into which it has fallen insofar as relates to life insurance, might not be amiss. In the past, various phases of the subject have been presented before the Association by outstanding members, and to them we are all indebted for the study and thought embodied in their excellent contributions.

Mr. Laird, in his characteristic style and concise, analytical manner, has selected for discussion a number of important features. Without question, the adoption of the present "standard" definition of "permanent" was a signal advance and has resulted in sparing the companies a great deal of grief. How frequently under the old "total and permanent" clause were claims presented which we could not approve if we adhered to the "strict and literal" interpretation of the clause, but in which the claimants felt (in many instances with justification) that they were entitled to benefits! A "waiting or qualifying" period, allowing

for a presumption of permanency, was much fairer and more equitable to the claimants and, for the companies, greatly simplified the handling of claims.

Mr. Laird points out that less than five per cent. of today's business is being written with disability income. I think we all concur with his statement that the standardized benefit now being offered by many of the companies would not appeal very strongly to the public, but it does enable the agent to satisfy a prospect who might insist upon a disability clause. There is no question that the feature is not being stressed today in the sale of life insurance because of the agent's fear that the company's refusal to issue the disability clause might jeopardize his sale of the life contract.

Our primary interest today centers around disability claims and the many problems they present. In the handling and disposition of questionable, unfair, and litigious claims, we not infrequently encounter unfavorable and undeserved criticism, which reflects upon both the local agents and the companies they represent. It is regrettable that the institution of life insurance should be placed in such an unfortunate position, and it imposes a special responsibility upon the hands of the claim departments. The executive who holds this office has a real task to perform and one that demands the full measure of his skill and resourcefulness. It is his duty to secure all the facts in each case, which often is difficult of attainment, and to settle the claim equitably and satisfactorily to both claimant and company, which at times is utterly impossible.

Mr. Laird and Mr. Dechert have both referred to that particular group of claims that we all find so troublesome—those characterized by subjective symptomatology without evidence of organic pathology. In the early days of disability underwriting, little could the interested companies foresee the difficult situation that was to develop from claims of this nature. And confronted today by the many problems they present, the companies have no recourse but to handle them to the best of their individual abilities, although in general following similar lines of procedure.

When a claim arises in which two or more companies are interested, there is no doubt that concerted action is desirable, although this is not always obtained. At times, we have all been guilty of "ploughing our own furrow," and my own Company has been no exception. Nevertheless, it is my opinion that, in these inter-company claims, there is, generally speaking, a definitely increasing spirit for closer coöperation being displayed.

I was particularly interested in Mr. Laird's account of the inspection trip that Doctor Smith and Mr. Day, of the Connecticut General Life Insurance Company, made into the field for the purpose of reviewing claims "on location". I have had some experience along this line and am convinced that the time, trouble, and expense, of these trips are more than offset by the results; and it is my further opinion that, for the companies which are not large enough to maintain an adequate claim personnel and field organization, such trips are really indispensable.

Mr. Dechert referred to the part played by the United States Government through its war risk insurance in building up a public consciousness as to the usefulness of disability coverage. This, undoubtedly, was an important factor in the popular demand for disablement insurance; but, on the other hand, it cannot be gainsaid that the disability clause as presented in the attractive manner that it was by the insurance companies made a strong appeal on its own merits to the buying public.

Mr. Dechert stresses another point—and rightly so—that of the danger of lump sum settlement. There are some who maintain that a claim should either be approved or outrightly declined. Theoretically correct though this may be, there are occasions when it seems compatible with sound judgment and equity to offer a lump sum settlement. Nevertheless, I am absolutely in accord with Mr. Dechert when he sounds a warning that our policy be guarded in this respect.

Doctor Wilson, in his discussion, makes the very significant point as to the need for securing the coöperation of the attending physician in our problem claims. It is true that, in many cases, we have been attempting to adjust the claim without seeking the support of the claimant's physician; but the reason for this is

no doubt to be found in the very practical difficulty of following such a procedure when an adequate claim organization in the field is lacking—a condition which obtains in most companies outside of a few of the larger ones.

Personally, I feel deeply grateful to Mr. Laird and Mr. Dechert for their kind acceptance of our invitation to be with us today and to discuss my paper. They are both very busy men and, I know, were able to come here only at considerable inconvenience to themselves and at the cost of interference with other duties. I am sure that I speak for all those assembled at this meeting when I say that we are indeed delighted to have had these "laymen" with us today.

DR. DEWIS—Our next paper deals with a subject which we are afraid has been somewhat neglected in the past deliberations in this Association. The company from which it emanates has long been identified with statistical studies on important medical impairments. Dr. Fisher has rightfully been considered the pioneer in early routine use and study of blood pressure observations. The present study Dr. Fisher has delegated to his able assistant, Dr. David E. W. Wenstrand, who will present a paper entitled "Family History".

# FAMILY HISTORY

By D. E. W. Wenstrand, M. D., Assistant Medical Director

*The Northwestern Mutual Life Insurance Company*

From earliest times in the recorded history of mankind, genealogy has been given a prominent place by the recorders of human progress. The first chapters of Genesis devote much space to family histories and to the longevity of the men who lived for hundreds of years to beget a multitude of sons and daughters. So down through the ages the human race has followed the practice of ancestor veneration until today there is still a strong interest on the part of many in family trees, but, unfortunately, in getting data for life insurance purposes the information is often too fragmentary and inaccurate. Perhaps this is one of the many reasons why statistics obtained from family histories recorded in life insurance examinations are sometimes confusing and not rarely almost contradictory.

As medical men, we realize that heredity as developed from exact family histories is one of the important factors in diagnosis and prognosis. The old-fashioned family physician, knowing his patients for two and occasionally three generations, could foretell with uncanny assurance how members of this family or that would react to infection and disease. In every complete clinical history attention is devoted to this item, to take the place of the personal knowledge just mentioned above. As a result, from the beginning of medical risk selection the examination blank has had a space for the family record.

From the laboratory comes other evidence on this subject. After many years of study and experience in breeding white mice, Maud Slye has said: "What goes into the germ-cells must come out in the offspring." Her experiments have been closely controlled, but even in the heterogeneous matings of man, this dictum obtains though modified by more variables. In a recent monograph, Madge Thurlow Macklin, M. D., discussing "The

Rôle of Inheritance in Disease", has stated the same thought as related to the study of genetics in these words: "It became evident that what was put into a mating, sometimes latent, sometimes obvious, came out in the offspring with mathematical precision."

No attempt will be made in this paper to review the vast amount of scientific and statistical work which has been done in this field; in fact, the task would be beyond my time and your patience, but mention should be made of a few additional names and some further short quotations to furnish a background for the thoughts and comments which follow the tabular studies leading to this presentation.

Almost fifty years ago, Mr. Emory McClintock, then Actuary of the Northwestern Mutual, at the suggestion of Dr. Fisher, for a second time investigated overweights and it was demonstrated that the family history definitely influenced longevity. Let me quote from an address given by Dr. Fisher at our Agents' Annual Meeting in 1921: " . . . . . The material (issues 1858-1886) was divided into two classes, one in which longevity is shown, 'Exceptional Family Record', by neither parent dying under age 70. In the other class, 'Usual Family Record', where one or both parents were reported dead under age 70, it was found there was a loss of over two hundred fifty thousand dollars ($250,000), when compared with the general mortality experience of the Company. In the class, 'Usual Family Record', the mortality was almost forty points in excess of that where longevity was shown, that is, where neither parent was reported dead under age 70 at the time of the approval of the risk, illustrating the fact that 'inherited constitution fundamentally and primarily determines how long an individual will live' (Pearl), a very important factor in risk selection."

As is well known, later studies have confirmed the relationship in successful overweight selection between "exceptional family record" and a favorable mortality. It was demonstrated in the "Specialized Mortality Investigation" of 1903, from which a few figures are reproduced in Table I (A).

Fifteen years ago there appeared a series of articles in the "Scientific Monthly" by Dr. Raymond Pearl called "The Biology

of Death". In 1922 the material, somewhat amplified, was published under the same title in book form and a recent rereading has impressed me even more forcibly that his postulate, "a careful selection of one's parents in respect of longevity is the most reliable form of personal life insurance", has been demonstrated biologically, experimentally, and statistically. He develops his thesis not only by his own researches, but also by quoting from the works of such authors as Karl Pearson, Jaques Loeb, Alexander Graham Bell, Alexis Carrell, Irving Fisher, and many others. Last year Dr. Pearl produced another volume, "The Ancestry of the Long-lived," which is a mathematical study involving the parents and grandparents of 1,579 persons who lived ninety years or longer. This is much too profound for me to follow in its complicated calculations and formulæ, but a similar conclusion is reached; namely, "Taking all the evidence presented in this study as a whole, it would seem to leave no doubt as to the importance of heredity in the determination of the longevity of the individual human being". In this connection, let me also quote another statement from Dr. Macklin's monograph: "It is well known that longevity is an inherited trait which characterizes some families; yet it is one that of necessity requires a very long life to prove its existence". The works of these authors are worth reading for information and stimulation.

At an early meeting of this Association, Dr. Fisher suggested that what he pleased to call "Class Cards" should be written and filed for twelve different groups of risks by the various companies in order to make combined studies possible at some future date. This, so far as I know, was the first attempt in this country to tabulate and to study strictly medical impairments and, I believe, led directly to the "Specialized Mortality Investigation". I have heard Dr. Fisher say on many occasions that he never visited New York in the 1890's without calling on Mr. McClintock, who was then the Actuary of the Mutual Life Insurance Company, and discussing this project, which was undertaken by the Actuarial Society of America in 1900. Number Twelve in this group was made up of those where two or more of the applicant's immediate family were reported dead of tuberculosis. It

may be at least of historical interest to give briefly the results which the Northwestern Mutual has experienced in this class, bearing in mind that the selection has always been most conservative, especially as to weights and other factors which may influence the development of tuberculosis. [See Table I (B).]

In another section of Table I, Section (C), have been collected other data referring to family history now in our files. It is admitted that there has been a lack of uniformity in the manner of study but, so far as possible, explanatory evidence has been submitted to make comparison feasible. In some classes the numbers are too small to permit sound conclusions and here and there in certain groups the results are far from uniform, so that a ready explanation is not easy. However, all have been included to show by this means also the interest we have had in family history for so many years.

The general mortality of the Company heads the list as a basis for evaluating the results quoted below. It is seen that only in groups (1) and (2) a wide deviation occurs from the average. This is not significant in the unknown family history because the numbers are inadequate; also, the third period in two or more cases of heart disease in the family nullifies to some extent the earlier increased mortality. It is undoubtedly true that from 1909 on the selection in other respects became more severe and we then had blood-pressure readings to aid us. Here, as in all cardio-vascular-renal family histories, we have always viewed border-line arterial tensions with grave misgivings.

Where both parents died at age 55 or under, there is a slight rise in mortality, and it should be said that these cases have never been accepted unless the deaths were due to acute infections or to accidents, that is, environmental causes. Furthermore, in the cases accepted the ages of the grandparents showed reasonable longevity or, at the older ages, the brothers and sisters had also attained years which argued for an inherited constitution to survive. Here is found the chief reason for having retained the history of grandparents in our examination blank and also for requesting information in regard to aunts and uncles at times when the immediate family history is short. Let me quote again from Dr. Macklin: "Variation in type of inheritance is dependent upon

many factors, involving dominant and recessive characteristics as carried in the chromosomes of both parents, so that a trait may be transmitted without being apparent in either parent."

Only a few comments need be made on the remainder of this Table. Cancer and tuberculosis in the family, in this as well as in the recent study which goes into more detail, may apparently be ignored, provided the risk is first class in other respects. What we shall do about two or more cases of cancer is still open to debate. It is our opinion that where both parents have died of cancer and perhaps one or more grandparent as well as a brother or a sister, it would be foolhardy to accept. Perhaps the sameness of the organ involved should add to our caution because, as you know, Maud Slye has demonstrated in her laboratory that in certain strains of mice, the same organ has been involved for generations. Dr. Macklin affirms that in her human histories the same holds true, adding: "Unrelated persons were affected in ten per cent. of the series, and related persons in one hundred per cent., for in all instances in which husband and wife were affected, children were also affected". (Cancer in 71 families.) From what data we have, it would seem safe to ignore the fact that one parent has died of epilepsy, and again I am impressed by what the same geneticist (Macklin) says: "Epilepsy may be dependent upon multiple factors, so that its descent from parent to child seldom occurs."

In Table II we present our own experience, involving the material which was submitted by us for the "Medical Impairment Study", and some additional groups studied along the same lines. Reference should be made to one class only; namely, apoplexy or paralysis, two or more dead under 60. The mortality of 159% is by policies, while in Table III, Section 1, 55.1% is the result by amounts, covering a major part of the same data. If taken by policies, it is evident that the second figure would be considerably over 100%. Only in this one class is it found that the results in the ratios between actual and expected deaths differ widely as calculated by policies and amounts. In a relatively small group this, of course, happens at times due to the size of the policies involved.

Tables III, IV, V and VI display a current study of 3,412 policy cards made especially by our Actuarial Department for this paper. These represent issues of 1921 to 1928, inclusive, carried to the anniversaries of 1934. The average exposures vary from 6.2 years to 8.3 years in the different groups. We agree that the ideal of the law of averages has not been met because the numbers are too small, the exposure too short, and absolute homogeneity is lacking. However, we feel that, knowing how the selection has been made, certain assertions may be made. In the first place, we expected a higher mortality in the cardio-vascular-renal family history groups, but the figures tell the story. It must be borne in mind that many, many such cases have been declined. The risk was, in our opinion, first class in every other way in order to approve. It is demonstrated that with one or more other impairments the mortality is somewhat higher and yet, in tabulating these additional codes, it is found that the scattering is so great that no reasonable deduction seems possible. Out of a total of 584 recorded, 185 referred to the two codes tonsillectomy and appendectomy. The only others which showed a concentration of over twenty were: pneumonia, abnormal tonsils, hemorrhoids, low specific gravity, and one case of tuberculosis in the family. In eight instances an inorganic heart murmur appeared and twice a previous history of abnormal arterial tension; whether high or low, I cannot say. There were only three histories of previous albuminuria, nine of casts, and three of glycosuria. As has been said already, we have always tried to eliminate every case where there was any evidence, even remote, of beginning or border-line cardio-vascular-renal disease in the individual under consideration. Also, it should be recorded that the $115,000 loss under age thirty and dead in duration 1 to 5 years was carried on one life in three policies. The insured was drowned in a motor boat accident. Omitting this death, the total ratio would be changed from 115.8% to 67%.

In Table VI the causes of death have been listed, and from the distribution it is apparent that we are dealing with a fairly old average age, certainly well over forty. This is also demonstrated by the definite preponderance of years of exposure over age forty.

The cardio-vascular-renal deaths, including three sudden deaths, are distributed as follows:

| | |
|---|---|
| All Groups | 55 deaths or 44.0% |
| Groups 1-2-3 | 37 deaths or 45.7% |
| Groups 4-5 | 18 deaths or 40.9% |

If we leave out those dying under forty, we find:

| | |
|---|---|
| All Groups | 49 deaths or 48.5% |
| Groups 1-2-3 | 34 deaths or 50.0% |
| Groups 4-5 | 15 deaths or 43.0% |

Degenerative diseases of the heart, arteries, and kidneys begin ordinarily in the forties and fifties, so let us see what took place from the ages forty to seventy among the Northwestern Mutual's deceased members during the years 1925, 1928, and 1931. The total deaths between forty and seventy numbered 9,975, of whom 4,215 died from the same causes as those included in the percentages given above, or 42.2%. The differences are slight, but there is a definite increase of cardio-vascular-renal deaths in Groups 1, 2, and 3 as compared with the general death lists, while Groups 4 and 5 show approximately a similar percentage. It is our feeling that in small classes the causes of death are significant, though, perhaps, from the actuarial standpoint this is not a sound deduction.

In the August number of the "Readers' Digest" appears an abstract of an article from the "Scientific American" in which the author makes some very startling statements of the unreliability of mortality statistics, asserting that death certificates are from 20% to 75% inaccurate due to the "fashionableness" of certain diseases from time to time. I cannot agree with these sweeping allegations, but we all know that in examination blanks the causes of death are as often as not hearsay evidence, so at best we have before us only assertions which are not susceptible of proof. This is the difficulty with all life insurance statistics which are based upon the statements of the applicant, but, if the numbers involved are large enough, the errors are minimized and the results become convincing. Even in claim papers, unless autopsies have been made, the real causes of death are often obscure and we can set down only to the best of our ability what

seems to be most plausible from the description of the fatal illness as recorded by the attending physician, sometimes changing his classification. In other words, we must draw our conclusions guardedly in the smaller groups, such as those under consideration, and use our judgment and our experience as gained in the art of medical selection, which as yet is no more an exact science than is the practice of medicine. We may reach the goal some day.

We leave it to you to draw your own conclusions which may differ from ours, but we wish to stress again certain points. We are willing to agree that at first glance nothing very definite has been demonstrated from our recent study to prove our assumed postulate that heredity plays an important part in longevity, but, on the other hand, in our investigation and discussion of the presented data as a whole runs a line of evidence which indicates an association between the ages of parents, grandparents, and offspring. Certain proofs have been given from other sources—biological, experimental, and statistical—which to us carry much weight. Our fathers were firm believers in heredity. Then followed a period, after the discovery of the bacterial origin of disease, when hereditary factors were largely discarded, but now with the advent of modern genetics heredity again assumes its rightful place among environmental contingencies. We shall continue to weigh family histories in the selection of risks and to code the different classes for further study with the hope that some day it will be possible to arrive at the right solution.

A final quotation from Dr. Macklin seems appropriate: "In a recent issue of the Metropolitan Life Insurance Company's Bulletin, it is stated that the only six diseases which were not showing a decrease in death rate were cancer, diabetes, nephritis, arteriosclerosis, cerebral hemorrhage, and influenza. It will be noted that the first five include many examples of constitutional disorders, in addition to those which are infectious in origin; in other words, an appreciable proportion of these diseases are hereditary. As we decrease the number of deaths from infectious diseases, we naturally increase those from hereditary disorders. Heredity then becomes a very important factor in disease, and its importance increases as the years pass."

TABLE I

OLD RECORDS

(A) SPECIALIZED MORTALITY INVESTIGATION

1870-1899 (Inclusive)

| Class | (Modified Healthy English Table) All Years (1-30) | Percent |
|---|---|---|
| 59 | More than 30% over average; both parents lived over 70 | 117.97 |
| 60 | More than 30% over average; one or both parents dead under 70 | 147.15 |
| 62 | Between 20% and 30% over average; both parents lived over 70 | 98.59 |
| 63 | Between 20% and 30% over average; one or both parents dead under 70 | 120.14 |
| 65 | Weight between 15% below and 20% above average; one parent tuberculosis under 70 | 86.83 |
| 66 | Weight between 15% below and 20% above average; one parent nephritis under 70 | 82.12 |
| 67 | Weight between 15% below and 20% above average; one parent heart disease under 70 | 84.72 |
| 68 | Weight between 15% below and 20% above average; one parent apoplexy under 70 | 94.09 |
| 69 | Weight between 15% below and 20% above average; both parents dead under 60 | 102.84 |
| 70 | Weight between 15% below and 20% above average; both parents reached 75 | 88.53 |

TABLE I (Continued)

NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY EXPERIENCE

(B) One or More Cases Tuberculosis in Family History
1893-1907 to 1909—Actuaries' Table

Company's Average Mortality Same Period 56%

| | | First Year | | | First Five Years | | | All Years | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Exp. | Act. | % | Exp. | Act. | % | Exp. | Act. | % |
| Other than 10% underweight | 7,106 | 71,579 | 22,000 | 30.73 | 302,300 | 117,000 | 38.70 | 520,721 | 226,000 | 43.41 |
| 10% underweight | 1,567 | 16,443 | 7,000 | 42.57 | 71,704 | 26,000 | 36.26 | 131,025 | 65,000 | 49.61 |
| All weights | 8,673 | 88,022 | 29,000 | 32.95 | 374,004 | 143,000 | 38.23 | 651,746 | 291,000 | 44.65 |
| One parent tuberculosis all weights | 7,245 | 71,183 | 27,000 | 37.93 | 302,731 | 119,000 | 39.31 | 524,018 | 231,000 | 44.08 |

TABLE I (Continued)

(C) OLD RECORDS

General Mortality of the Company

| | | | |
|---|---|---|---|
| Issues 1885—1910 | Exposed to 1915 | 62.40% | Am. Ex. |
| Issues 1885—1910 | Exposed to 1915 | 85.80% | A. M. |
| Issues 1906—1915 | Exposed to 1920 | 57.30% | Am. Ex. |
| Issues 1906—1915 | Exposed to 1920 | 78.80% | A. M. |
| Issues 1906—1925 | Exposed to 1925 | 53.10%* | Am. Ex. |
| Issues 1906—1925 | Exposed to 1925 | 73.00% | A. M. |

*Estimated

| | Policies | Actual Claims | Deaths | Percent | Table |
|---|---|---|---|---|---|
| (1) Heart Disease in Family; 2 or More Cases | | | | | |
| 1885—1908 to 1915 | | $428,500 | 83 | 106.00 | Am. Ex. |
| 1901—1908 to 1915 | | 137,200 | 31 | 115.10 | A. M.(5) |
| 1909—1927 to 1928 | | | 128 | 82.00 | A. M. |
| (2) Unknown Family History | | | | | |
| 1885—1908 to 1915 | | 61,000 | 20 | 140.80 | Am. Ex. |
| 1901—1908 to 1915 | | 22,000 | 6 | 190.10 | A. M.(5) |
| 1909—1927 to 1928 | | | 12 | 76.70 | A. M. |
| (3) Epileptic Parent | | | | | |
| 1885—1908 to 1915 | | 71,900 | 38 | 36.80 | Am. Ex. |
| (4) Both Parents Dead 55 and Under | | | | | |
| 1885—1908 to 1915 | 12,857 | | 1,173 | 75.20 | Am. Ex. |
| 1901—1908 to 1915 | 5,509 | | 270 | 62.40 | Am. Ex. |
| 1901—1908 to 1915 | 5,509 | | 270 | 88.30 | A. M. |
| 1906—1915 to 1920 | 8,363 | | 303 | 77.98 | A. M. |
| (5) Cancer and Tuberculosis in Family History | | | | | |
| 1885—1908 to 1915 | 1,199 | | 113 | 53.90 | Am. Ex. |
| 1901—1908 to 1915 | 617 | | 38 | 51.10 | Am. Ex. |
| 1901—1908 to 1915 | 617 | | 38 | 65.80 | A. M. |
| 1906—1915 to 1920 | 874 | | 36 | 36.93 | A. M. |
| (6) Apoplexy or Paralysis; 2 or More in Fam. History | | | | | |
| 1906—1915 to 1920 | 608 | | 37 | 59.70 | A. M. |
| (7) Cancer; 2 or More in Family History | | | | | |
| 1885—1908 to 1915 | 166 | | 19 | 51.60 | Am. Ex. |

Am. Ex. American Experience Table
A. M. American Men Table
A. M.(5) American Men Table Select And Ultimate Table

TABLE II

NORTHWESTERN MUTUAL EXPERIENCE

Medical Impairment Study
1909-1927 to 1928—Basic Table

| | Years Exposed | Deaths | Exp. Dths. | Percent |
|---|---|---|---|---|
| Apoplexy or Paralysis; 2 or More Dead under 60 | 1,618 | 21 | 13.21 | 159.0 |
| Diabetes; 2 or More Dead under 60 | 821 | 1 | 5.87 | 17.0 |
| Insanity; 2 or More under 60 | 823 | 8 | 7.11 | 112.5 |
| Tuberculosis; One Case with Other Impairments | 124,505 | 750 | 960.54 | 79.0 |
| Tuberculosis; 2 Cases | 24,488 | 136 | 203.18 | 66.9 |
| Tuberculosis; 3 or More Cases | 4,201 | 31 | 44.10 | 70.3 |
| Epileptic Parent | 2,902 | 9 | 21.31 | 42.2 |
| Unknown Family History | 2,368 | 12 | 15.65 | 76.7 |
| Alcoholic Parent; Applicant Abstainer | 8,597 | 32 | 64.24 | 49.8 |
| Alcoholic Parent; Applicant Moderate User | 5,677 | 25 | 44.09 | 56.7 |

TABLE III

SPECIAL FAMILY HISTORY MEDICAL IMPAIRMENT CODES

**Apoplexy or Paralysis; Two or More Cases in Family Under 60 (Alone)**

Issues 1921 to 1928 Incl. Carried to Anniv. in 1934; American Men Table

| | | 253 Policies* | | Actual Deaths | | Expected Deaths | | Ratio | |
|---|---|---|---|---|---|---|---|---|---|
| | Issue Ages | No. | Amount | No. | Amount | No. | Amount | % | |
| Total All Durations | Ages Under 30 | 118 | 453,000 | | | .48 | 1,853 | | |
| | 30–39 | 287 | 1,270,000 | 4 | 20,000 | 1.50 | 6,890 | 290.3 ± | 96.85 |
| | 40–49 | 493 | 6,709,000 | 5 | 29,000 | 4.78 | 64,187 | 45.2 ± | 13.50 |
| | 50 & up | 294 | 3,613,000 | 8 | 45,500 | 6.24 | 98,609 | 46.1 ± | 10.90 |
| | Total | 1,192 | 12,045,000 | 17 | 94,500 | 13.00 | 171,539 | 55.1 ± | 8.90 |
| Total All Ages | Durations | | | | | | | | |
| | 1 to 5 years | 716 | 6,511,000 | 12 | 76,500 | 5.73 | 60,972 | 125.5 ± | 24.20 |
| | 6 Yrs. & Sub. | 476 | 5,534,000 | 5 | 18,000 | 7.27 | 110,567 | 16.3 ± | 4.90 |
| | Total | 1,192 | 12,045,000 | 17 | 94,500 | 13.00 | 171,539 | 55.1 ± | 8.90 |

**With Other Impairments**

Issues 1921 to 1928 Incl. Carried to Anniv. in 1934; American Men Table

| | | | | Actual Deaths | | Expected Deaths | | Ratio | |
|---|---|---|---|---|---|---|---|---|---|
| | Issue Ages | No. | Amount | No. | Amount | No. | Amount | % | |
| Total All Durations | Ages Under 30 | 28 | 73,000 | | | .10 | 291 | | |
| | 30–39 | 171 | 1,339,500 | 2 | 10,000 | .87 | 6,402 | 156.2 ± | 73.60 |
| | 40–49 | 285 | 1,662,500 | 1 | 25,000 | 2.66 | 14,144 | 176.8 ± | 117.90 |
| | 50 & up | 86 | 513,000 | | | 1.99 | 12,441 | | |
| | Total | 570 | 3,588,000 | 3 | 35,000 | 5.62 | 33,278 | 105.2 ± | 40.50 |
| Total All Ages | Durations | | | | | | | | |
| | 1 to 5 years | 408 | 2,836,000 | 1 | 25,000 | 3.19 | 21,555 | 116.0 ± | 77.30 |
| | 6 Yrs. & Sub. | 162 | 752,000 | 2 | 10,000 | 2.43 | 11,723 | 85.3 ± | 40.20 |
| | Total | 570 | 3,588,000 | 3 | 35,000 | 5.62 | 33,278 | 105.2 ± | 40.50 |

*Figure includes both parts.

Total Combined Ratio: 63.2 ± 9.4

TABLE IV

SPECIAL FAMILY HISTORY MEDICAL IMPAIRMENT CODES

**Cardio-Vascular-Renal Disease; Two or More Cases in Family (Alone)**

Issues 1921 to 1928 Incl. Carried to Anniv. in 1934; American Men Table

| | | 1552 Policies | | Actual Deaths | | Expected Deaths | | Ratio | |
|---|---|---|---|---|---|---|---|---|---|
| | Issue Ages | No. | Amount | No. | Amount | No. | Amount | % | |
| Total All Durations | Ages Under 30 | 727 | 3,989,500 | 4 | 25,000 | 2.90 | 16,046 | 155.8 ± | 51.90 |
| | 30–39 | 3,076 | 18,418,500 | 8 | 44,500 | 15.08 | 90,708 | 49.1 ± | 11.60 |
| | 40–49 | 3,594 | 24,330,500 | 20 | 191,500 | 31.86 | 227,846 | 84.0 ± | 12.50 |
| | 50 & up | 2,673 | 14,071,000 | 35 | 104,000 | 55.16 | 279,319 | 37.2 ± | 4.20 |
| | Total | 10,070 | 60,809,500 | 67 | 365,000 | 105.00 | 613,919 | 59.5 ± | 4.80 |
| Total All Ages | Durations | | | | | | | | |
| | 1 to 5 years | 7,162 | 42,764,000 | 45 | 238,500 | 62.93 | 360,621 | 66.1 ± | 6.60 |
| | 6 Yrs. & Sub. | 2,908 | 18,045,500 | 22 | 126,500 | 42.07 | 253,298 | 49.9 ± | 7.10 |
| | Total | 10,070 | 60,809,500 | 67 | 365,000 | 105.00 | 613,919 | 59.5 ± | 4.80 |

**With Other Impairments**

Issues 1921 to 1928 Incl. Carried to Anniv. in 1934; American Men Table

| | | 618 Policies | | Actual Deaths | | Expected Deaths | | Ratio | |
|---|---|---|---|---|---|---|---|---|---|
| | Issue Ages | No. | Amount | No. | Amount | No. | Amount | % | |
| Total All Durations | Ages Under 30 | 254 | 1,680,000 | 3 | 115,000 | 1.01 | 6,567 | 1751.2 ± | 674.04 |
| | 30–39 | 1,222 | 7,348,500 | 4 | 22,000 | 6.07 | 36,568 | 60.2 ± | 20.16 |
| | 40–49 | 1,534 | 11,651,500 | 15 | 88,000 | 12.72 | 95,491 | 92.2 ± | 15.90 |
| | 50 & up | 830 | 5,275,600 | 13 | 49,000 | 17.02 | 98,070 | 50.0 ± | 9.20 |
| | Total | 3,840 | 25,955,600 | 35 | 274,000 | 36.82 | 236,696 | 115.8 ± | 13.00 |
| Total All Ages | Durations | | | | | | | | |
| | 1 to 5 years | 2,861 | 20,054,500 | 29 | 247,000 | 23.79 | 157,536 | 156.8 ± | 19.40 |
| | 6 Yrs. & Sub. | 979 | 5,901,100 | 6 | 27,000 | 13.03 | 79,160 | 34.1 ± | 9.30 |
| | Total | 3,840 | 25,955,600 | 35 | 274,000 | 36.82 | 236,696 | 115.8 ± | 13.00 |

Total Combined Ratio: 75.1 ± 5.00

TABLE V

SPECIAL FAMILY HISTORY MEDICAL IMPAIRMENT CODES

**Tuberculosis and Cancer in Family (Alone)**

Issues 1921 to 1928 Incl. Carried to Anniv. in 1934; American Men Table

| | | 727 Policies | | Actual Deaths | | Expected Deaths | | Ratio |
|---|---|---|---|---|---|---|---|---|
| | Issue Ages | No. | Amount | No. | Amount | No. | Amount | % |
| Total All Durations | Ages Under 30 | 663 | 1,526,500 | 3 | 4,000 | 2.73 | 6,318 | 63.3 ± 24.40 |
| | 30–39 | 1,822 | 7,674,500 | 7 | 34,500 | 10.04 | 42,021 | 82.1 ± 20.70 |
| | 40–49 | 2,299 | 13,595,500 | 13 | 72,000 | 23.67 | 141,304 | 51.0 ± 9.40 |
| | 50 & up | 1,314 | 9,753,000 | 21 | 79,500 | 30.00 | 219,031 | 36.3 ± 5.30 |
| | Total | 6,098 | 32,549,500 | 44 | 190,000 | 66.44 | 408,674 | 46.5 ± 4.70 |
| Total All Ages | Durations | | | | | | | |
| | 1 to 5 years | 3,317 | 18,280,500 | 19 | 81,000 | 26.28 | 165,224 | 49.0 ± 7.50 |
| | 6 Yrs. & Sub. | 2,781 | 14,269,000 | 25 | 109,000 | 40.16 | 243,450 | 44.8 ± 6.00 |
| | Total | 6,098 | 32,549,500 | 44 | 190,000 | 66.44 | 408,674 | 46.5 ± 4.70 |

**With Other Impairments**

Issues 1921 to 1928 Incl. Carried to Anniv. in 1934; American Men Table

| | | 262 Policies | | Actual Deaths | | Expected Deaths | | Ratio |
|---|---|---|---|---|---|---|---|---|
| | Issue Ages | No. | Amount | No. | Amount | No. | Amount | % |
| Total All Durations | Ages Under 30 | 100 | 286,500 | | | .36 | 1,149 | |
| | 30–39 | 522 | 3,217,000 | 2 | 21,000 | 2.76 | 17,751 | 118.3 ± 55.80 |
| | 40–49 | 742 | 4,146,000 | 7 | 41,000 | 6.99 | 38,477 | 106.6 ± 26.90 |
| | 50 & up | 549 | 4,733,500 | 5 | 16,500 | 12.45 | 109,310 | 15.1 ± 4.50 |
| | Total | 1,913 | 12,383,000 | 14 | 78,500 | 22.56 | 166,687 | 47.1 ± 8.40 |
| Total All Ages | Durations | | | | | | | |
| | 1 to 5 years | 1,221 | 7,718,500 | 2 | 8,000 | 10.95 | 77,865 | 10.3 ± 4.90 |
| | 6 Yrs. & Sub. | 692 | 4,664,500 | 12 | 70,500 | 11.61 | 88,822 | 79.4 ± 15.30 |
| | Total | 1,913 | 12,383,000 | 14 | 78,500 | 22.56 | 166,687 | 47.1 ± 8.40 |

Total Combined Ratio: 46.7 ± 4.10

## TABLE VI
## INDIVIDUAL DEATHS

Group 1. Apoplexy or Paralysis; two or more cases under 60 (both classes).

Group 2. Cardio-Vascular-Renal Disease; two or more cases all ages (alone).

Group 3. Cardio-Vascular-Renal Disease; two or more cases all ages (with other impairments).

Group 4. Tuberculosis and Cancer; one of each or more cases (alone).

Group 5. Tuberculosis and Cancer; one of each or more cases (with other impairments).

| CAUSES OF DEATH | GROUP 1 | | GROUP 2 | | GROUP 3 | | GROUP 4 | | GROUP 5 | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ages under 40 | Ages 40 and over | Ages under 40 | Ages 40 and over | Ages under 40 | Ages 40 and over | Ages under 40 | Ages 40 and over | Ages under 40 | Ages 40 and over | Ages under 40 | Ages 40 and over |
| Septicemia | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Tuberculosis | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 1 | 0 | 4 | 1 |
| Cancer | 1 | 1 | 0 | 6 | 0 | 3 | 0 | 4 | 0 | 1 | 1 | 15 |
| Diabetes | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| Anemia | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Apoplexy | 0 | 1 | 0 | 2 | 0 | 3 | 0 | 1 | 0 | 1 | 0 | 8 |
| Insanity | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| Disease of Nervous System | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Mastoiditis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Organic Heart Disease | 1 | 1 | 0 | 4 | 1 | 2 | 0 | 4 | 0 | 2 | 2 | 13 |
| Coronary Disease | 0 | 1 | 1 | 9 | 0 | 3 | 1 | 5 | 0 | 0 | 2 | 18 |
| Arterio Sclerosis | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| Pneumonia | 0 | 0 | 0 | 4 | 2 | 0 | 1 | 0 | 0 | 0 | 3 | 4 |
| Respiratory Disease | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Intestinal Disease | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| Peptic Ulcer | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| Liver Disease | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 4 |
| Appendicitis | 0 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| Hernia | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Nephritis | 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 2 | 1 | 5 |
| Suicide | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 3 | 0 | 1 | 0 | 8 |
| Casualty | 1 | 0 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 5 |
| Sudden Death | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 |
| Not Specified | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| TOTAL | 4 | 12 | 7 | 37 | 4 | 16 | 7 | 26 | 2 | 9 | 24 | 101 |

DR. DEWIS—This Association is fortunate in having numbered among its members one who has the ability to talk in an entertaining and authorative way on all the various phases of life insurance medicine. I refer to Dr. William Muhlberg, Vice President and Medical Director of the Union Central Life Insurance Company, who will open the discussion.

DR. MUHLBERG—In this most interesting study, Dr. Wenstrand has ventured into a field of medico-actuarial investigation that presents perhaps as many difficulties and perplexities as can be encountered in any medical statistical research. Not only must the results be predicated on data that are frequently guess-work on the applicant's part, but very often the known facts are disguised or misrepresented. An applicant will only reluctantly admit that any parent or sibling has died of insanity or syphilis; and the same reticence may apply in a minor degree to cancer, because in the minds of many persons, there is still some odium associated with this cause of death.

It occurred to me, that with reference to cancer, we might roughly gain some idea of the accuracy of the applicant's statements by a study of the causes of death of parents past the age of 40. Our own death claims for the past five years have uniformly shown that from 10% to 11% of the claimants past the age of 40, die of cancer. It would be reasonable to assume, since the cancer rate has not materially changed in the past generation, when age distribution is considered, that about 10% of the parents of applicants who have died past the age of 40, should also approximate at least 10%, especially since there would be more women among parents of applicants than among policyholders. The cancer rate of women past age 40 is higher than among men.

I reviewed applications for insurance, listing causes of death of parents past age 40. In 1,000 deaths thus tabulated, 82.7% gave a known cause other than cancer. Ten and two-tenths per cent. stated the cause was unknown. Only 7.1% acknowledged cancer as the cause. This would lend some support to the supposition that our applicants are somewhat reluctant to give a family history of cancer, because in the lay mind there is a firm

conviction that cancer is inheritable. However, this would not change in any way Dr. Wenstrand's statement regarding the favorable experience where a family history of cancer is actually acknowledged.

It has always been true that persons have eagerly sought for some method whereby they might foretell their life-span. Astrologists, spiritualists, palmists, soothsayers, etc., etc., have all had their day. It is no surprise that medical scientists and statisticians have tried their skill at predicting; but, except on the basis of averages, they have not been notably successful. Warthin, for instance, believes that, barring accidents and accidental diseases, the life-span is definitely determined by the chromosomes at birth and nothing in the way of health conservation, etc., can alter the life-span. As you may remember, W. W. Graves believes that the conformation of the scapula tells the story; and more recently Dr. Felix Bernstein bases his prediction on the degree of presbyopia.

Perhaps our medico-actuarial statistics are the most reliable of all. Given a man in a healthful occupation, with a slow pulse about 65, and a blood pressure around 115, especially if he is light-weight, good habits and otherwise in good health, his chances of reaching a ripe old age are very favorable. So much our statistics have clearly indicated. That there should be added to this a favorable family history with marked longevity in the parents and grandparents, most of us firmly believe; but of all the factors involved, this one is the most difficult to establish. And conversely, applicants with poor family histories, especially where there are early deaths from cardio-vascular-renal disease, are believed to have relatively poor prospects of living to be a hundred. Dr. Wenstrand has shown us how difficult it is to solve this problem—simple as it may appear before it is undertaken—and why we as medical directors have had to rely on preconceived ideas, rather than actual experience in evaluating family histories.

In Table I (C)—Both parents dead 55 and under, the mortality is unfavorable by the American Experience Table for issues of 1885-1908 to 1915; but for issues of 1906-1915 to 1920, it is

favorable by the American Experience Table. Perhaps the difference in length of exposure may account for this discrepancy.

With reference to the favorable influence of longevity in parents on overweights, I believe that all medical directors now recognize this by dealing more liberally with such cases. As a matter of fact, the favorable family history appears to be the most important extenuating factor for overweights. You will recall how disappointing were the results of our studies among applicants with long and short spine measurements.

When the difficulty of the family history research is kept in mind, I believe Dr. Wenstrand is too modest when he expresses some little disappointment in his own findings. It seems to me his study has confirmed us in our previous assumptions, that deaths at early ages of cardio-vascular-renal disease in the family history requires care and keen judgment in the selection of the risk. Perhaps because medical directors have always been cautious, is one reason why this impairment does not stand out more unfavorably in the studies.

To me, an interesting and, I believe, most valuable deduction from Dr. Wenstrand's research, is his opinion that the blood pressure requirement has done much to counteract the influence of a poor family history of heart disease. At any rate, if any Company is qualified to express an opinion on this subject, it is his—thanks to Dr. Fisher's acumen and courage.

No doubt, with increasing use of the electrocardiograph and X-ray, further inroads can be made on our distressingly high death rate among policyholders from cardio-vascular-renal disease. I believe, too, the miscroscopic examination of urine for casts is a further safeguard. At any rate, studies made by my Company have shown that in otherwise good risks, a moderate number of hyaline casts is compatible with a normal mortality for the first ten years, but that after ten years, the death rate creeps up to about 160%, with cardio-vascular-renal deaths taking an undue proportion.

The Northwestern Mutual's experience for a family history of one or more cases of tuberculosis is, of course, not in harmony with the Supplement of the Medical Impairment Study of the

Joint Committee, but Dr. Wenstrand explains the discrepancy when he states that the selection has always been most conservative, especially as to weights and other factors. I have no doubt that if the selection is severe, especially with reference to weight, age, environment, etc., a favorable mortality will result. The Medical Impairment Study clearly indicates that very favorable mortality ratios are possible with such super-selection, but it might be well to remember that unless good judgment is used, the results may not differ materially from the Medical Impairment Study figures, unless of course, the steady decline in tuberculosis as a cause of death comes to the rescue.

Dr. Wenstrand's paper again confirms our inferences that a family history of cancer is probably of minor significance. In recent years, the studies of the Mendelians and Miss Slye have rather shaken our confidence; but it is evident that in spite of indisputable scientific logic to the contrary, a family history of cancer is practically negligible, perhaps because in the general population, the human genes are so thoroughly shuffled that pure strains of cancer-immune and cancer-predisposed persons can't be unscrambled.

We really would like to know more about the significance of diabetes in the family history. Dr. Wenstrand's figures apparently indicate that this is of no significance, but I wonder whether this may not have been due to very cautious selection, or perhaps meager material. At any rate, we must probably pay heed to the warnings of our specialists in diabetes. They are almost unanimous in their opinion that the family history of diabetes is important. Very likely our blood sugar tests, etc., will help our selection, just as blood pressure has evidently helped in the cardio-vascular-renal family histories.

Personally, I feel that Dr. Wenstrand's contribution on Family History has been a most important one, but it does offer unusual difficulties in the way of interpretation—difficulties enhanced by the fact that the Company he represents has always been noted for the care with which their risks are selected.

DR. DEWIS—The discussion will be continued by Dr. Charles B. Piper, Medical Director of the Connecticut Mutual Life Insurance Company.

DR. PIPER—Dr. Wells and Members: That family history is of paramount importance is shown by the fact that no attempt is made to underwrite human lives without a complete statement of the family record. Individual impressions of the value of certain suggestive family histories have been strengthened by accumulated experience. Impressions have been fortified by the uniform conclusions of observers like Bell, Pearl and Irving Fisher. Japanese observers have testified to the material influence of long lived ancestors. In a group of some thousands of octogenarians, an investigation by Alexander Graham Bell gives an increasing percentage of individuals who live to ripe old age, in strict accordance with the advanced age attained by fathers or mothers.

In spite of these definitely established facts there is still lacking concrete evidence of the influence of family history as it effects life insurance mortality, except as it is shown that certain broad departures from normal do apparently unfavorably affect mortality. Dr. Wenstrand points out the difficulties surrounding an approach to this subject, and the value of his contribution has been influenced by these difficulties.

Life insurance companies have not adopted uniform standards of family histories, upon which they have accumulated a convincing experience, revealed by a sufficient number of cases. Even were we in possession of accurate statistics,—information based upon a classification of individuals exhibiting practically the same family history,—there would still be other things which would have to be considered. Some of these things are influences arising from occupation, education and environment.

Individuals born of parents who lived in extreme poverty, and who revealed the fact that father and mother, brothers and sisters, had succumbed at an early age from exposure or lack of resistance due to improper nutrition, might have been fortuitously able to escape these influences by adoption into a wealthy family which

would supply an environment calculated to produce a normal longevity. This is an extreme example but we must admit that there are many influences calculated to improve the prospect of long life in many an individual who has had a relatively poor start.

Besides this, every study of individuals classified according to family history could be no more than suggestive, because the underwriting practices of companies vary so widely. Severity on the part of one company, and greater optimism on the part of another, would inevitably influence the final results.

It is regrettable that actual evidence seems to be lacking that two deaths in the family from apoplexy, means an addition to the expected mortality in that group. Despite this lack, I am still firm in my personal conviction that a sufficient exposure will amply justify the conservatism apparent in the underwriting practice of many companies.

For example, in Table I, two cases of heart disease in the family, the mortality per cent. for all years of exposure averages about one hundred per cent. In Table III the total ratio with two cases of apoplexy under age sixty, gives only a total of 55.1% and in Table IV, two or more cases of cardiovascular-renal diseases, the ratio is 59.5%.

An interesting thing in Table III, is the fact that there is a very high mortality at the early ages,—namely thirty to thirty-nine. One would rather expect that if a family history of two cases of apoplexy was influential, the deaths would probably occur largely in the age group beyond fifty. It would scarcely be tenable that selection against the company was responsible for the large mortality in this young group, because from ages thirty to forty we would not expect that there would be premonitory symptoms with the impairment under discussion. What really could happen to cause a young man thirty-two, having two cases of apoplexy in his family history, to become aware of the fact that he had better provide himself with a considerable amount of insurance?

When we again go to Table IV, namely two or more cases of cardiovascular-renal disease in the family history, we find that the heaviest mortality is *under age thirty*. Here again, assum-

ing that the underwriting was uniformly careful and strict, we can scarcely understand why we find this higher mortality at these younger ages.

Dr. Wenstrand has pointed out that the conclusions in some cases are somewhat obscured when he considers cases "with other impairments". For example, Table IV, cardiovascular-renal disease, two or more cases, again under age thirty we find a very large ratio which, of course, is evidently due to the relatively small exposure in the first place; and the whole group without knowing accurately the material nature of the "other impairments" becomes at best only suggestive.

The general implication of Table I generally seems to support preconceived ideas about the importance of overweight and its influence upon mortality, especially in connection with a history of parents dead under age seventy. But we cannot draw our lines too closely and I cannot help wishing that some of these older records had been made, giving the same classification, but with one or both parents dead under age *sixty,* instead of seventy.

This paper would also seem to suggest that we who have been inclined to regard individuals of light weight, with some degree of leniency, may not have been far wrong. I do not think that I would feel the same assurance from the implications of Table II, as set forth by the results upon those giving a history of two diabetic deaths under age sixty. Obviously, the exposure here was so small that we are given results which would be entirely misleading. Other more suggestive data is available from the records of those companies who have obtained blood sugar determinations upon individuals presenting a history of *one* case of diabetes. It is my understanding that at least thirty per cent. of these individuals show an abnormal blood sugar. With *two* cases of diabetes in the family I feel positive that a much larger percentage of abnormal blood sugars would be encountered.

The final conclusion might be that it would be highly important for all of the companies to adopt certain broad classifications, such as two cases of apoplexy or paralysis occurring under age sixty, two or more cases of cardiovascular-renal diseases under age sixty, and two or more cases of diabetes under age sixty. Then

as early as practicable, obtain the actual results from a fairly large number of cases which have been thus uniformly classified and selected with reasonable care.

Criticism, if any, of Dr. Wenstrand's able paper would have to be that he was handicapped by a limited amount of material. That can be the only possible explanation of certain contradictory figures which, after all, do not materially change our convictions.

I think we shall all continue to attach unusual importance to family history. We shall probably regard two classes of abnormal family histories as being ominous; namely, apoplexy, paralysis and heart disease, occurring in two or more members of the family, especially in connection with individuals overweight and exhibiting even a slight tendency to high blood pressure; second, two or more cases of diabetes.

It is my impression that a little more leniency is being exhibited in cases with histories of insanity or epilepsy in the family history. Certainly, tubercular family histories, in view of the rapidly falling death rate from tuberculosis may not be as alarming as they were twenty years ago. This one class particularly well illustrates the possibility of a beneficial influence from education, environment, and the progress of medical science.

DR. DEWIS—Dr. Wenstrand, will you close the discussion?

DR. WENSTRAND—There is only one thing I want to say, very heartily and cordially—that I appreciate the kindness with which Dr. Piper and Dr. Muhlberg handled my paper. As far as diabetics are concerned, and the family history of diabetes, we did not have enough to give any real information, so perhaps it would have been just as well if I had left out that part of the paper. There wasn't anything there to work on.

I hope that if nothing more, my paper may do something to stimulate the further study of family histories. I believe that perhaps some of us have gotten away from paying very much attention to the family history end of our examination plan. I say the same thing that Dr. Dublin did this morning about peptic

ulcer—if this has stimulated further study it will have been worth while.

DR. DEWIS—At our meeting here three years ago we presented a diagramatic film showing the various phases of the normal and diseased heart and the corresponding electrocardiographic tracings. The Lahey Clinic was responsible for the manufacture of this film and it was shown through the courtesy of Dr. Frank Lahey. During the interval the Lahey Clinic has developed another film, the title of which is "Some Aspects of Clinical Endocrinology", and Dr. Lahey has again been most courteous in permitting us to exhibit the film at this time.

(FILM)

Following the showing of the film Dr. Dewis called upon Dr. Whitney, who made a short announcement regarding the annual dinner, and after Dr. Whitney's announcement, adjourned the meeting until ten o'clock the morning of October 18th.

SECOND DAY

DR. WELLS—It gives me much pleasure to read a telegram just received from J. Allen Patton, M. D.:

"Hollywood, California
Best wishes for a successful meeting.
Would like to be there with you.
Regards from California to all."

I know Dr. Patton is very sorry not to be able to be with us. He has always taken such great interest in these meetings. It was very thoughtful of him to send his greetings.

The first paper is on "Mitral Stenosis", and will be presented by Dr. Cecil C. Birchard, Chief Medical Officer of the Sun Life Assurance Company. Although Dr. Birchard is known to the majority of us as the guiding medical genius of one of the largest life insurance companies, yet to his medical colleagues in Montreal he is equally well known as an outstanding clinician whose opinion is eagerly sought. At our meeting in Hartford several years ago Dr. Birchard delivered an admirable address on the "Arteriosclerotic Heart". His paper today will undoubtedly prove to be equally instructive.

# THE DETECTION OF MITRAL STENOSIS

By C. C. Birchard, M.D., M.R.C.P. (London), F.R.C.P. (Canada)

*Chief Medical Officer, Sun Life Assurance Co. of Canada*

This very brief and insignificant paper was prompted in a measure by the belief which is held by some of us, that persons suffering from the effects of rheumatic infection of the heart may be so classified clinically that the better of them may have insurance at premium rates nearer to standard than the rates which we now offer, and that the more hazardous risks may be segregated and avoided. To this end more exactitude in the diagnosis of mitral stenosis is needed in life insurance practice.

The mortality—the real mortality—in persons with clinical mitral stenosis is quite unknown, except in a very rough way for a very few years after detection. The Medico-Actuarial and the Medical Impairment Studies can give no answer to such questions as: If a group of lives each with uncomplicated mitral stenosis is insured at age forty, what will be the mortality rate at age fifty-five? The duration of the exposures was quite too short. Patients of the latter age with mitral stenosis are uncommon. Most of them die before that. A sixty-year-old with the condition is rare; few indeed survive into the seventh decade. The abstraction of even a small proportion of such from any group of lives should have a relatively large effect on the mortality of the remainder.

In the mortality investigations of insurance offices it has not, for very good reasons, been possible to classify applicants with circulatory abnormalities on an aetiological basis. The classifications have had to be on the basis of the most conspicuous physical sign, with the result that statistical groups are very far from homogeneous. That group which has been designated "Mitral Insufficiency" has been the least homogeneous of all of them—a motley collection of normal hearts, rheumatic hearts with all degrees of damage from slight to extensive—including

many with mitral stenosis or aortic insufficiency, arteriosclerotic hearts, and hearts with congenital anomalies. But with the advent of better methods of diagnosis and greater average skill in the medical practitioners, we are coming slowly toward the time when it will be possible to classify heart conditions for statistical purposes on the basis of the actual morbid processes with subclassification according to the degree of development, and not by any one outstanding sign as hitherto.

The group of lives in which we are interested at the moment are those who have rheumatic lesions. Depending on the stage of development of the lesions, and the skill of the examining physicians, they come to us either without or with physical signs. The former get insurance at ordinary rates, and their number is not small; the latter get insurance with an enhanced premium, some being rejected when we learn that they exhibit signs of mitral stenosis or other manifestations of advanced rheumatic disease. It follows that the need of the moment is some improvement in technique to be followed by those who examine applicants for insurance, which will allow of the detection of at least a reasonably large percentage of these cases of rheumatic heart infection which now pass as normal, and which will give in the average some fairly accurate measure of the extent of the damage after the diagnosis of rheumatic heart disease has been made. With this in view, it is my purpose to recall to you with some emphasis certain well known procedures which in my opinion will separate from those whom we now insure at normal rates, a proportion who have well developed rheumatic disease (those with clinical mitral stenosis), and from that large heterogeneous statistical group bearing the label "mitral insufficiency" a still larger proportion.

There are numerous signs and symptoms by which one can appraise to a degree the extent of damage which has taken place in rheumatic hearts, but for the purposes of this paper we are interested only in the signs which are indicative of mitral narrowing, and only in those which the peculiar limitations and disabilities imposed upon the examiner do not render impracticable.

The heart may be seriously damaged by repeated infection without developing signs of mitral narrowing. On the other hand clinical signs of narrowing are an indication that the heart has suffered very serious damage, excepting that occasionally a normal heart may exhibit bruits closely approximating those to be regarded as pathognomonic of mitral stenosis. For insurance purposes such hearts without exception are to be regarded as badly impaired. The condition is a touchstone which segregates accurately a proportion of the worst risks. And of all conditions affecting the heart there is none in the diagnosis of which so great a proportion escape detection. I have no certain means of knowing, but I feel perfectly certain that, in insurance applicants the condition is detected less than five times out of every ten times that it should be found. If you believe otherwise, pick at random, a dozen cases of mitral stenosis at any heart clinic, and tabulate the findings of the first dozen visiting physicians—and visitors to such places are likely to be much above the average in skill, and really interested in clinical medicine. You will find that a large proportion of the visitors fail, even teachers of clinical medicine in medical schools. The surgically minded of them miss quite ninety per cent.

There are very few technical precautions to be practiced if one wish to have precision in detecting this condition:

One must know that there is one cardinal sign, and one only—the low pitched bruit of mid-diastole or presystole. It is of little practical importance, even to the highly trained ear, to note that the first sound is, or is not, of snapping quality, and the presence or absence of a thrill is of no more than academic interest. A thrill is nothing but a low pitched sound of an intensity that it may be felt, and the ear is a hundred times more sensitive than the hand as a detector of vibrational energy. Besides, if one worries about thrills one finds them where no thrill of any significance exists.

If a low pitched murmur occurring at a particular time in the cardiac cycle is to be regarded as the sine qua non in the diagnosis of this condition it may not be out of place to mention briefly the underlying physical principles which determine its

peculiarities. In the production of murmurs, when fluids flow through elastic orifices there are two governing factors:

a) If the orifice is large the bruit must be of low pitch. As valve orifices go, the mitral during diastole is relatively large, with the result that any such mitral bruit, whether in mid-diastole or presystole must be of very low pitch. The principle is the same as that which makes a long piano wire vibrate more slowly than a short one under the same tension. By observation, the loudest and dominating elements of the murmur have a frequency of under one hundred cycles per second.

b) If the difference between the pressures obtaining on the two sides of the orifice is relatively low—i. e., low linear velocity of flow through the orifices—the initiation of the bruit will require a certain critical degree of narrowing. Failing this critical degree of narrowing, the murmur will not occur. Such murmur may be expected to be capricious about exhibiting itself, which is conspicuously the case with the murmur of mitral stenosis.

The above explanations are deductions from that theory of the physical production of heart murmurs, which I believe to be the true one.[1]

Since a fundamental character of the bruit of this condition is its low pitch—clinicians describe it as "rough" and "rumbling"—it behooves one to adapt his instrumental equipment to the character of the sounds. This is of easy accomplishment. Physicists investigated the characteristics of stethoscopes years ago to find that the bell mouthed type of instrument in common use a generation ago and still fairly popular is in resonance with, and therefore amplifies, a series of notes of definitely lower pitch than does the new diaphragm type. It is easy enough to convince one's self that this is the case, by examining with stethoscopes of both types (first with a diaphragm instrument, then with one

1. Birchard, C. C.—"Physics of Endocardial Murmurs"—to be published shortly.

with a bell mouth) a small group of patients known to have mitral stenosis. With any degree of luck, one will very soon discover a patient in whom the characteristic low pitched bruit is readily audible with the bell mouthed type and quite inaudible with the diaphragm type. To have a really good "batting average" the former type of instrument must be used when seeking mitral stenosis.

Another trick which must be made use of for the certain detection of the murmur is predicated upon its capriciousness, which is the outcome of the orifice being relatively wide and the linear velocity of flow through it slow. The latter may be corrected by a fairly vigorous test exercise, which will probably increase the velocity of flow sufficiently to cause the mitral flaps to vibrate and produce the bruit.

These two together (proper stethoscope and test exercise) are, however, quite insufficient to uncover the murmur with certainty. The patient must, immediately and with the least possible delay after the test exercise, assume the left side prone posture. The effect of this posture is that it produces a further decrease in the area of the mitral orifice by reason of the external pressure on the left side of the heart, the pressure being the result of the weight of the organ as it descends upon the left side of the parietal pericardium. This decrease in area is necessary in many patients for the critical degree of narrowing which is necessary for the initiation of the murmur. The effect of the additional narrowing is to increase the rate of flow; if the velocity of flow is sufficient every elastic constriction in a tube—in this case the mitral orifice—must vibrate. Careful auscultation with the proper type of stethoscope under these circumstances will discover the murmur, perhaps for a few beats only, if there is any such to be found, and the stethoscope has been applied exactly at the proper point. Cases are reported in the literature which exhibited the characteristic bruits of mitral stenosis, with no stenosis to be found post mortem, which suggests that the critical degree of narrowing for the production of the presystolic murmur may be produced occasionally by posture at a normal mitral orifice.

But the bruit is audible over a very limited area only and the reason for the smallness of this area is unknown, but he who does not appreciate that the area of audibility is small may miss it with the greatest of ease. This limited area is usually over or slightly median to the palpable apex beat as the patient lies on his left side—the apex thrust in this posture being in the anterior axillary line and well away from the normal position when the patient is erect.

While all of these several technical points which I have mentioned are well known to all, I am certain that a large proportion of us omit one or more of them in actual practice. This is my excuse for calling your attention to matters already well known to you.

You will have observed that I have not mentioned the X-ray findings in mitral stenosis, and have barely mentioned or entirely omitted sundry other signs, symptoms and functional tests which are to be found in the text books. This has been intentional for the reason that we, as medical advisers of insurance companies, are interested principally in the diagnosis of mitral stenosis at primary examination as it may be practiced by good average physicians to whom we pay fees insufficiently large to justify our demanding any overly prolonged examination or study. The special procedures can be and are used by selected examiners for more detailed investigation of cases already suspect.

Is there any inducement which might be offered to our better examiners to apply as a matter of routine the technical procedures outlined? An inducement would be any method which would make for ease and speed in recording of observations, obviating the tedious description in words. This could, I believe, be accomplished if we could popularize the use of graphic methods in reporting. Accordingly I have had reproduced and distributed to you a graphic method of recording the results of auscultation which originated in principle with some person unknown and has been developed by my colleague in the heart clinic of the Montreal General Hospital, Dr. Harold Segall.[2] This has been made

2. Segall: Amer. Heart Jour. Vol. VIII, p. 533 (1933) Can. Med. Assoc. Jour. Vol. XXVII, p. 632 (1932).

practicable by the use of booklets of stickers for attachment to clinical records. As developed by Segall it is, I believe, too complicated for use in the special heart examination forms used by various companies, and I have attempted a simplification designed to indicate to the examiner that he is expected to search for signs of mitral stenosis both before and after a test exercise and in the left side prone posture as well as with the patient upright. The use of the method allows the practitioner to jot down his observations step by step with the progress of his examination. A reasonable amount of concerted action by the companies might popularize the method of recording results, with considerable saving in time, to the practitioner.

I have gone through that early stage of development as an adviser to a life insurance company when I thought that one could make an unskilful physician skilful by putting before him a sufficiently clever, comprehensive and bewildering medical form—actuarial criticism of medical forms suggest that they never get beyond that stage. I know now that the medical form used can accomplish little to produce skill where it does not exist, but I do believe that it is possible that concerted action by the companies through suitably designed forms may eventually lead to many physicians acquiring greater precision in the diagnosis of mitral stenosis.

Dr. Wells—The discussion will be opened by another one of our prominent Canadian members, Dr. John M. Livingston, Medical Director of the Mutual Life Assurance Company of Canada.

Dr. Livingston—Dr. Birchard, in his excellent paper, has attacked one of our difficult problems and has offered a solution. He tells us how we may separate a proportion who have well developed rheumatic mitral stenosis from those we now assure at standard rates and how we may separate a still larger proportion from that "large heterogeneous statistical group bearing the label mitral insufficiency". As I read his paper, his solution is to obtain capable examiners who will examine all applicants in the left

prone posture after exercise, being careful to use the bell type stethoscope and apply it exactly at the proper point which is over or slightly median to the palpable apex beat. If a low pitched mid-diastolic or presystolic bruit is discovered even for a few beats only, a diagnosis of mitral stenosis is justified. This agrees very well with the "Criteria for the classification and diagnosis of heart disease" issued by the "New York Tuberculosis and Health Association". They state, "A positive diagnosis of mitral stenosis can be made only in the presence of a characteristic murmur which is a low pitched diastolic rumble, often with presystolic crescendo accentuation. Sometimes this latter is the only murmur heard. The murmur may be only mid-diastolic; in the presence of auricular fibrillation it is often heard only during the first part of diastole. The murmur of mitral stenosis can sometimes be heard only with the patient lying on his back on left side. It is almost always louder in these positions than in the erect. Acceleration of the heart rate by slight exercise will make plain frequently a murmur which is otherwise inaudible". Paul White states, "The auscultatory proof of mitral stenosis is the presence of a rumbling apical mid-diastolic murmur, with or without presystolic accentuation, in the absence of considerable aortic regurgitation or other cause of marked ventricular dilatation". With such agreement there is no ground for criticism of the solution offered.

Dr. Birchard feels certain that in assurance applicants mitral stenosis is detected less than five times out of every ten times it should be found. R. C. Cabot admitted that over half the cases of mitral disease are not recognized during life in hospital patients and from autopsy material he concluded that mitral stenosis existing alone or combined with other valve lesions is about three times as common as all other rheumatic valve lesions combined and that mitral stenosis uncomplicated is about twice as common as any other single valve lesion. Osler reported that 35% of his rheumatic cases showed organic valve lesion and that in 96% of these the mitral valve was involved. Others have estimated that at least 50% of rheumatic cases develop endocarditis. C. F. Coombs states, "The actual date at which the cardiac

lesion is first established cannot be ascertained in a vast majority of cases. However, from the cases that can be studied from the beginning it is certain that the foundations of the valvular lesion are laid in nearly every instance before the age of 16". He states further that the average age of the onset of symptoms in those cases where it has been possible to inquire into this rather vague point has been 26. The impression one obtains from reviewing life assurance examinations is very different and it would appear there is room for improvement in the diagnosis of mitral stenosis.

It seems there may be some difficulty in distinguishing the mid-diastolic murmur of mitral stenosis from some other sounds heard at the apex during diastole and which frequently in the past have been described as suspicious or suggestive of mitral stenosis. R. C. Cabot states, "Mitral stenosis should be suspected in the presence of doubling of the second sound (or a third heart sound) along the left sternal margin". L. F. Barker states, "The splitting of the second sound at the apex so common in mitral stenosis is attributed by some to vibration of the rigid valve when the blood begins to enter the ventricle from the auricle, this giving rise to a sound just after the normal second sound. Many believe that this "cantering" sound is not a true reduplication of the second sound heard at the apex but is in reality a divided diastolic murmur that points to mitral constriction". G. A. Gibson states, "Another very important auscultatory sign of mitral stenosis is the double sound heard during the period of the diastole of the ventricles. This phenomenon which vividly recalls the "Postman's Knock" has been generally named the reduplicated second sound but is better called Double Shock sound. It is due to the first inrush of blood into the ventricle, such inrush being more sudden and forcible than under normal conditions from the increased blood pressure in the left auricle because of constriction of the mitral orifice. This double-shock sound has been found in a large number of cases which manifested eventually all the usual signs of mitral stenosis". Paul White states, "Normally there are three heart sounds at each cardiac contraction, but the third which is heard at the cardiac apex or lower end of the sternum, or best between these two points, is faint and often in-

audible. The mechanism of the third sound is not known; it is probably due to the opening snap of the mitral valve or to the vibration of the ventricular walls from the impact of the blood stream which rushes into the suddenly dilating ventricles through the mitral and tricuspid valves from the auricles where the head of pressure at the beginning of diastole is high, or to both of these factors". He states that the intensity of the third sound is pathologically increased in two conditions: mitral stenosis and ventricular dilatation with heart failure. The murmur of mitral stenosis he explains by the vibration of the heart walls and valve caused by the rush of blood through the stenosed mitral valve into the left ventricular cavity. Its greatest intensity is usually at its onset at the time of the third sound, when the flow of blood into the ventricle begins (which does not occur immediately at the time of the second sound when the aortic valves close at the end of the systole).

It thus appears that many of the signs considered suspicious of mitral stenosis originate at the mitral orifice early in diastole and are caused by conditions similar to those which produce the typical mid-diastolic murmur of mitral stenosis if the proper technique is employed. I hope Dr. Birchard will tell us if cases of the type showing only a so-called reduplicated second sound at the apex develop a low pitched mid-diastolic murmur when examined carefully by the procedure he has recommended.

Dr. Segal uses very successfully his graphic method in reporting his findings. I doubt whether it can be used successfully for life assurance examinations, even if simplified. Our examiners, after all, are not specialists, and I agree with Dr. Birchard that we cannot obtain a satisfactory examination from an unskilled physician by putting before him a "clever comprehensive and bewildering medical form". Accordingly it behooves us to select the best examiners we can and then support them. We should endeavor to devise some method whereby a more accurate diagnosis of mitral stenosis can be made and I hope that this question will be taken into consideration by the heart Committee of this Association.

DR. WELLS—The discussion was to have been continued by Dr. Harold M. Frost, Medical Director of the New England Mutual Life Insurance Company. Dr. Frost is particularly qualified because of his heart studies and his interest in the development of the cardio respiratory test. I regret to announce that he is ill and unable to be present. Two other members of his staff are also incapacitated because of illness, so I have requested Dr. A. E. Johann, Assistant Medical Director of the Bankers Life Insurance Company of Des Moines, to read Dr. Frost's paper.

DR. FROST—Dr. Wells and Members: The basic theme of Dr. Birchard's treatment of "The Detection of Mitral Stenosis," as I conceive of it, arouses my sympathetic response. By my interpretation, it is essentially a plea to undertake, by greater exactitude of diagnosis, a more refined classification of rheumatic heart disease than now obtains in life insurance medicine; to apply more accurately that premium rate appropriate to a given degree of severity of disease. As a fundamental factor in such sub-classification, Dr. Birchard stresses the desirability of greater proficiency in the detection of mitral stenosis, admittedly a most severe type of disease.

As to the lack of such proficiency among life insurance examiners in general, our confidential reports give daily proof. We have all frequently noticed a startling variety of contradictory reports as to location and timing of heart murmurs in a given case.

Dr. Birchard has outlined certain technical procedures which will aid in the detection of the more obscure signs of mitral stenosis; which will make possible a higher percentage of correct diagnoses at the primary examination and by the average examiner. Such an accomplishment is eminently desirable.

Personally, I do not believe that the answer to the problem of sub-classification here proposed lies ultimately in the services of the average examiner. The correct diagnosis of cardiac abnormalities, the ability to detect and evaluate the more obscure types, call for a degree of talent, of training, and of experience which cannot be expected of the average examiner, who works fre-

quently under unsatisfactory conditions, under pressure of varying types, and for fees which invite no painstaking attention to detail.

Heart blanks with elaborate, detailed questionnaires are of use only in that they focus the attention of the examiner and tend to prevent his oversight of obvious abnormalities. As Dr. Birchard points out, they cannot produce skill where it is lacking.

My personal instinct is to place confidence in men rather than elaborate questionnaires; to keep the examination blank as simple as possible; to endeavor to pick examiners who may be trusted to report the essential facts without prodding.

While the use of the proper stethoscope may be important, I believe that the degree of acuity of hearing of the examiner is much more important; a matter almost impossible to determine in the case of the average examiner. I believe that such variation in acuity of hearing accounts for a great deal of the diversity of confidential reports as to location, timing and transmission of murmurs in given cases.

The answer to the problem, as I see it, is the development of a small body of well-trained, expert Chief Examiners, strategically located for efficient referee work; selected by a Medical Director after personal visitation and survey of the field; paid on a scale sufficiently commensurate with the schedule of fees for private work to command careful and conscientious service. Such examiners will require no detailed questionnaire as a spur. The Medical Director may rely upon their findings, their initiative and thoroughness. They will be his court of final resort.

I do not believe that we need to worry much about those applicants with mitral stenosis who escape detection at the primary examination by the average examiner, if the acceptance of his report is limited to relatively small amounts of insurance. The errors will not materially affect the general mortality.

Our experience of the last few years having proved that it is mainly the larger claims which have been responsible for excessive general mortality, common sense dictates that applicants for relatively large amounts should be more carefully examined, preferably by a Chief Examiner. I would rather have one exam-

ination by a competent Chief Examiner, made under satisfactory conditions, than multiple examinations by others. In this fashion a greater proportion of the larger, more damaging claims arising from mitral stenosis should be avoided by the increased elimination of applicants suffering from this disease.

Likewise, before accepting any case with a history of severe rheumatic infection, of heart disease, or presenting signs of possible heart disease at the primary examination, the opinion of a Chief Examiner should be obtained, based upon his own examination.

I do not mean to belittle any effort to improve the grade and efficiency of the average examiner. I believe, however, that his limitations must be recognized, particularly in the presence of such a disease as mitral stenosis; that his function as the primary sorting agency should ever be clearly in mind. Any improvement in the efficiency of this agency, along the lines suggested by Dr. Birchard, would, of course, tremendously aid in medical selection. However, final dependence as to the facts should be placed only in a more highly trained corps of Chief Examiners.

As a possible aid in detecting the elusive diastolic bruit, I call your attention to a method of photography of heart sounds which has recently attracted my interest and which I have seen demonstrated. I know that some of you are already familiar with it. In the Journal of the American Medical Association, Volume 104, Number 8, page 628, February 23, 1935, Bierring, Bone and Lockhart describe the "electrostethograph", an instrument for the photography of heart sounds. It is manufactured by the Cambridge Instrument Company of New York City. I was immediately intrigued by the unusual clearness and legibility of the photographs. The instrument offers, in addition, synchronous electrocardiograms and pulse tracings; and the advantage of a triple, amplifying, binaural stethophone. I believe it gives promise of great usefulness in the work of the Home Office and of the Medical Referee, although the instrument is probably too expensive for general work in the field by the average examiner.

In conclusion, a brief reference to the special work which we have been carrying on in the New England Mutual by means of

the cardio-respiratory test may be in order. In spite of reports to the contrary, we are still proceeding, and intend to proceed, largely though not entirely along the lines previously reported to you. The foregoing qualification is due to the fact that we have for several years made no attempt to select for standard insurance those applicants who, from history and physical signs, appeared to us to have a probable organic heart disease. In this class, of course, mitral stenosis is included. Neither this functional test nor any other known to me will, in my opinion, prove of any value in detecting mitral stenosis.

Our last investigation of mortality covered the policies issued between the year 1922 and December, 1933, carried to June 30, 1935. The ratio of actual to expected claims by amounts was, by the American Experience Table, 71.4%; by the American Men's Select Table, 107.4%. In the last two years there has been a slight falling off, the peak having occurred as of June 30, 1933, with a ratio of 115.4% by the American Men's Select Table. This is the mortality of the entire, heterogeneous group selected by means of this test. We have made no sub-classification since our former report to this Association.

Dr. Johann—Dr. Frost mentioned in his paper the electro-stethograph, or electric ear, we might call it. I had the privilege of doing a little work with that machine while Mr. Lockhart was perfecting his first two models, and I found it very interesting. The machine is simplicity in itself, and anyone can operate it who can tune in a radio set. The tracings are very simple to interpret as they are just graphic tracings of the sounds we have been hearing for years through the stethoscope.

The advantages of the set, in addition to its simplicity, are that it will enable you to time murmurs, sometimes a very difficult thing in a rapidly acting heart, and it will bring out murmurs that we cannot take by ordinary methods either because they are too faint or because they are of too short duration. I recall especially the case of a young clerk we had in our office who had a history of some throat trouble with a supposed heart complication about ten or fifteen years previous. The heart condition was

reported to have cleared up, and he had been examined a number of times at the home office without anyone being able to detect any heart lesion. We used the electric ear on this particular individual, and were surprised to find that there was a presystolic murmur shown in the tracing. The reason we had missed it was because of its extremely short duration. As I recall it, this murmur had a duration of only a fortieth of a second. This young man, being a very wise individual, was quite concerned about this presystolic murmur, and it is his intention to have tracings made at yearly intervals to see if that murmur, as shown in the machine, is going to increase in duration and intensity. Time only will tell, of course.

I think this wise young man is adopting a program which we might well follow, or at least a principle we might use in our selection.

Dr. Birchard has pointed out that our group of mitral regurgitation, classified under the heading 302, is a miscellaneous type of all heart conditions. If the young man mentioned above finds that his murmur is increasing in severity he will probably go to somebody for life insurance. I hope it isn't to the Bankers Life Company. We cannot pass upon applicants who have some evidence of cardiac damage until we know whether or not it is a progressive condition, but I believe we can reverse the order and check back into the history of many of these individuals and determine whether over a period of five years, or parhaps longer, they have shown any tendency for the cardiac condition progressing unfavorably, as is so characteristic of rheumatic heart disease.

I think we have available in our files much information which we could use if we would, and we could get considerably more valuable information by correspondence with attending physicians. I believe if this were done we would save ourselves a great deal of embarrassment, and I think most certainly the individual who has a record of a valvular condition which has shown no tendency to unfavorable progression over a period of five or more years, is entitled to much more favorable consideration than the one who comes in for examination without any

previous unfavorable record and the only thing we know about him is that today on examination he shows evidence of endocarditis, which is so commonly classified as mitral regurgitation with transmission to the axilla.

DR. WELLS—Dr. Birchard, will you be good enough to close the discussion?

DR. BIRCHARD—Out of the discussions, I think that only two points need any further comment.

One is with respect to sounds heard at the apex in diastole, other than those due to mitral stenosis. The "third heart sound" is the only common one, and its presence should make one suspicious of the possibility of mitral stenosis. It is heard frequently in young people, and most often when the pulse is slow, and most commonly in persons under twenty years of age. If one looks for it, one finds it extremely frequently. If you are observing young persons, by posturing you can bring out a third heart sound in a very considerable proportion, and it is of a very definite character. It is of a peculiar distant booming character that can't very well be mistaken for anything else. Having heard a few third heart sounds, it is not likely that it will be confused with a murmur produced in diastole at the mitral orifice. But one must have heard a few to recognize it with confidence.

The other point is the acuity of hearing. I have been told by aurists that, in older people who have passable hearing, most of the damage is in the upper ranges, sounds of vibration frequencies of well over 1,000 cycles per second. The sounds that escape from the chest are of under 1,000 cycles per second; in other words, in that portion of the sound spectrum where serious impairment of hearing is least common. At under 100 cycles per second, the pitch of the characteristic bruit of mitral stenosis, most people with minor degrees of impairment are not likely to be much handicapped. The man who can't hear conversation well, can't hear well because he is poor on sounds that are of over 1,000 cycles per second, but when you put him to work on

sounds that are of around 100 to 150 cycles per second, usually he can hear well enough.

There is one interesting point about acuity of hearing which seems to be an extremely wise provision of nature, and that is, that our ears are not normally sensitive in the lower ranges. Actually, the amount of energy that escapes from the chest with the ordinary first sound of a heart is relatively enormous. If one were to represent it by a bar diagram, and give the bar representing the first sound of the heart (a low pitched sound) a height of one mile, the ordinary diastolic murmur of aortic insufficiency (a high pitched sound as heart sounds go) would be represented by a bar about two inches high. The low pitch of the first sound and the relative insensitivity of the ear to low pitched sounds prevents it being a nuisance. You can readily imagine what this room would sound like, with a hundred people in here, if we could all hear as acutely at around one hundred cycles per second (the frequency of the first heart sound) as we can hear at one thousand cycles per second (approximately the frequency of an aortic diastolic murmur). The room would appear to be full of bass drums. In short, it would be quite impossible to live with one's self.

Dr. Wells—We are exceptionally honored to have with us today Dr. Herman L. Kretschmer, Clinical Professor of Genito Urinary Surgery of Rush Medical College, Chicago. He is known to us not only as Treasurer of the American Medical Association, but also as a Urologist of international reputation, and I am always glad to say that he is a resident of the Middle West. His society connections and contributions to literature are far too numerous to mention. His subject today is "Prostatic Conditions from the Life Insurance Standpoint".

Dr. Kretschmer—In the first place, I would like to thank Dr. Wells and his Program Committee, and also the members of the Association for asking me to take part in your program. I appreciate this honor very much.

In the second place, I wish to apologize for not sending in a paper, as I was requested to do a long time ago by Dr. Wells. The reason I couldn't do it was because of the nature of the paper which, in a measure, is statistical. I felt that it would be very much better to not write the paper until the day before I left home so as to have it, if I may so state, up to the last minute.

In the third place, I would like to ask the members of this Association a rather interesting question. I would like to know why this Association meets in this city, in this hotel, on the same floor and at the same time as the Casket Manufacturers. It would interest me to know why that is.

# PROSTATIC OBSTRUCTION FROM THE LIFE INSURANCE POINT OF VIEW

By Herman L. Kretschmer, M. D.

During the past five years a distinct change has occurred in the treatment of prostatic obstruction. This change is characterized by the fact that there is an increasing trend away from open prostatectomy and toward the use of various types of transurethral surgery. Opinions on this subject are still divided, and it will probably require the passing of several more years before the various differences of opinion, which prevail today, are clarified and unified.

At the present time one finds three different schools of thought on this subject. In one group are those who believe that the prostatic patient in need of treatment is a candidate for open surgery. They take the position that open prostatectomy is a more radical procedure than transurethral resection, in that the entire obstruction is removed at one operation, whereas resection leaves behind it prostatic tissue which at some later date may increase in size and hence again produce an obstruction that will call for further treatment. That such a possibility exists in the case of resection cannot be denied; however, if this should occur, a second resection can always be carried out. On the other hand, it may not be amiss to call attention to the fact that recurrences have taken place after open prostatectomy even when the operation has been performed by some of the most competent prostatectomists.

In the second group are those who believe that every case can be subjected to transurethral resection provided one is able to introduce and manipulate the resectoscope. A larger number of men are to be found in this group than in the previously-mentioned classification.

In the third group are those who assume a sort of middle-of-the-road attitude—men who believe that the cases of median bars, contractures, middle lobes, and the small lateral lobes, should

have the benefit of resection whereas the large hypertrophies should be treated by open prostatectomy.

There can be no question of the fact that, so far as the patient is concerned, resection is a less formidable procedure than open surgery, and even should there be a recurrence attended with symptoms, a second resection can be done. Moreover, practically all agree that when it is a matter of relieving obstruction due to carcinoma of the prostate, resection is the method of choice, supplemented by radium or deep roentgen therapy.

My own personal viewpoint on this subject can be summarized very briefly. I have made no selection of cases and in the past 44 months I have performed but one prostatectomy. Resection was not considered inadvisable either because of the size of the prostate or its pathological condition. Furthermore, resection was the procedure in cases of serious disease in other organs—conditions which necessarily precluded open surgery to relieve the obstruction.

The differences of opinion are naturally of great interest to a group of medical directors of life insurance companies, not only from the standpoint of life insurance as such, but also from the standpoint of the company's relation to the patient having a policy with a disability clause. There can be no doubt of the fact that transurethral resection has a much lower mortality rate than open prostatectomy. The post-operative stay in the hospital is of a shorter duration after resection, the period of morbidity is shortened, the post-operative complications are less frequent and less serious, a matter of considerable importance in all operative work. Another point in favor of this procedure is the fact that transurethral resection has made it possible to relieve a certain number of patients who, for various reasons, cannot undergo open prostatectomy.

Transurethral resection is the direct means of extending aid to a very definite group of cases that cannot be relieved of obstruction by means of surgical prostatectomy, since the presence of serious disease in other organs necessarily precludes that sort of intervention. Formerly this group of patients was denied the benefits of surgery, but today obstruction can be combatted suc-

cessfully by a relatively simpler procedure, thus enabling them to resume their occupations. Similar to the larger number of patients who were relieved when the sphere for prostatectomy was widened by the advent of the two-stage operation, the number of patients who can be successfully operated upon has been increased by the use of transurethral resection.

Of interest from the life insurance point of view is the fact that many patients, as they become familiar with the advantages of transurethral resection, seek relief of their obstruction at a very much earlier period than they did in the days of open surgery; hence many serious complications are avoided and there is a marked reduction in the mortality rate. But, formerly, when open surgery was the preferred procedure, the patient often sought relief late in the course of the disease, and the result was that serious lesions from obstruction and infection occurred, increasing the operative mortality.

The life insurance examiner, as well as the life insurance company, should be keenly aware of the possibility of the presence of prostatic obstruction in all male candidates for insurance who are forty years old or over, and they should be alert as to the probability of prostatic obstruction with each succeeding decade; if the prospective candidate for insurance is over fifty, the probability of prostatic obstruction should be constantly borne in mind. The life insurance examiner should make a special attempt to elicit symptoms of prostatic obstruction and, if present, a rectal examination should be made and the matter of residual urine determined by the passage of a small rubber catheter under aseptic conditions.

In order to present in detail some of the above-mentioned points, it might be well at this time to review my experiences with transurethral resection. To date I have performed 734 transurethral resections upon 651 patients. In other words, in 11.1 per cent. of the cases, a second resection was necessary to relieve the patient completely.

The patients upon whom second resections are done naturally fall into three groups. In the first group are the patients with large hypertrophies in whom it is obvious that the resection

cannot be completed in one sitting. I have no hesitation in explaining to patients with very large hypertrophies that a so-called two-stage resection may be necessary.

In the second group are the cases in which I failed to remove enough tissue at the first resection to relieve the obstruction. As one's experience with resection increases and one becomes more and more proficient, this group of cases becomes smaller and smaller, as may be seen by the fact that in the last 200 cases a secondary resection was necessary in only 4.5 per cent.

In the third group of secondary resections are the cases of recurrent carcinoma; no one can gainsay the statement that here two resections are preferable to one permanent suprapubic fistula.

One point that should interest the members of this association is the well-known fact that the mortality from open prostatectomy increases with each decade of life. This hazard has deprived many patients from eighty to ninety years of age of being relieved of their obstruction. I am sure that the members of this association will agree with me that a procedure, whereby a patient over eighty years of age can be relieved of his obstruction with a relative freedom from danger and only a short stay in the hospital, is preferable to open surgery, even if later on a second resection is necessary.

The incidence of age in this series is given in the following table:

AGE

| | | |
|---|---|---|
| Youngest patient | 30 | years |
| Oldest patient | 89 | " |
| 30–40 years | 3 | cases |
| 40–50 " | 10 | " |
| 50–60 " | 130 | " |
| 60–70 " | 311 | " |
| 70–80 " | 166 | " |
| 80–90 " | 31 | " |

It is scarcely necessary to emphasize the great importance of obtaining a careful history and of making a complete physical examination in each and every case, which naturally leads to careful pre-operative study and preparation. All too often both the physician and the patient are of the opinion that resection is a minor procedure; and it is indeed unfortunate that this idea

has gained prevalence. I have repeatedly emphasized the fact that the operation is highly technical and far from simple, and that serious complications may result.

The following table shows the associated pathological conditions found in this series of cases:

ASSOCIATED GENERAL PATHOLOGY

| | | |
|---|---|---|
| Diabetes Mellitus | 25 | cases |
| Syphilis | 15 | " |
| Cord Bladder | 7 | " |
| Bronchial Asthma | 5 | " |
| Hemiplegia | 4 | " |
| Cerebral Thrombosis | 3 | " |
| Parkinson's Disease | 3 | " |
| Carcinoma of Stomach and Liver | 2 | " |
| Paralysis Agitans | 2 | " |
| Acromegaly | 1 | case |
| Buerger's Disease | 1 | " |
| Arteriosclerotic Gangrene of Toe | 1 | " |
| Manic Depressive Psychosis | 1 | " |
| Duodenal Ulcer | 1 | " |
| Polycythemia Veru c̄ Erythromelalgia | 1 | " |
| Transverse Myelitis | 1 | " |
| Lesion of Conus Medullaris | 1 | " |
| Epilepsy | 1 | " |
| Intestinal Obstruction | 1 | " |
| Basal Cell Carcinoma of Back | 1 | " |
| Malaria | 1 | " |

Of the various lesions found in this series of cases, lesions of the cardiovascular system head the list. Of special interest to the members of this association is the fact that in my experience there has been a tremendous increase in this particular group of cases. Whereas in a previous study of a series of patients upon whom I performed suprapubic prostatectomies there were 35.8 per cent. of patients with an associated heart lesion, a review of this series of cases showed that 64.3 per cent. suffered from cardiovascular disease.

This large number of cases may be due to several factors—first, to the generally recognized increase in the incidence of cardiovascular disease; in the second place, to the fact that many more so-called "bad risk" cardiac cases present themselves, or are referred by their physicians, for resection than one would ordinarily see in a similar number of candidates for surgical prostatectomy. In the third place, being keenly aware of the possibility

of this frequent occurrence, special attention is directed toward a careful study of the cardiovascular system. This includes, or should include, an electrocardiogram.

It is needless to state that every one of these patients is given the benefit of consultation with a cardiologist who outlines and directs the proper pre-operative, as well as post-operative, cardiac treatment. Although many cardiac cases suffered from severe heart lesions, none was refused resection. (One patient with preliminary suprapubic drainage will be resected as soon as the heart becomes stabilized.) As an illustration of the type of patient belonging to this group I would like to report briefly the following case:

A. H. L., aged 72 years, entered the Presbyterian Hospital on August 10, 1934, with a history of catheterization 4 months ago and daily for the past 2 weeks.

*Present Complaint:* For the past two years the patient has been obliged to arise from 1-2 times a night. There has been a decrease in the size and force of the urinary stream with an incomplete emptying of the bladder. There has been mild hesitancy for the past year.

*Blood Examination:* Reds, 5,330,000; whites, 8,600; hemoglobin, 96 per cent.

*Blood Pressure:* Systolic, 150; diastolic, 100.

*Blood Chemistry:* Creatinin, 1.3; nonprotein nitrogen, 31.6.

*Phenolsulpholnephthalein Test:* Showed a total output of 53 per cent. for 1½ hours.

*Urinalysis:* Showed a trace of albumin, pus, and a few red blood cells.

*Roentgen-Ray Examination:* Areas of increased density in the region of the lower left ureter.

*Cystogram:* Markedly irregular bladder with multiple large and small diverticula.

*Pyelograms:* Normal.

*Cardiogram:* Left axis deviation; myocardial damage; prolonged A. V. conduction.

*Operation:* Electro-resection of the prostate; bilateral vasectomy; under sacral anesthesia. 8/13/34.

*Discharged:* 8/23/34.

Although the cardiovascular group heads the list, there were many other patients with serious lesions who were resected. In this group diabetes mellitus heads the list. Needless to state, these patients are given both pre- and post-operative supervision by the diabetic service. There have been no difficulties in resecting this group of patients, although several of them suffered from very severe diabetes at the time of admission to the hospital.

There were 23 cases that had an associated lesion of the central nervous system. Contrary to the general belief that such patients are liable to have incontinence following resection, all were resected successfully and all are perfectly continent, so that I feel that an associated lesion of the central nervous system should not prevent the patient from receiving the benefits of resection.

It is a very old clinical observation that obstruction at the bladder-neck leads to secondary changes in the bladder and upper urinary tract. The frequency with which these changes are recognized is directly dependent upon the carefulness of the pre-operative study in each case. The extent of the changes is in direct ratio to the time that has elapsed between the beginning of the obstruction and the examination—in other words, in the patient who seeks relief early, secondary changes are rare; in the late-comer, they are relatively common. It should be emphasized here that most, if not all, of this secondary pathology, both in the bladder and kidneys, is preventable, provided the diagnosis is made early and corrective treatment instituted. And since this has a bearing on both morbidity and mortality, it should be of interest to members of this association and the companies whose medical activities are under their care. It may not be amiss to state that, if the patient is aware of the fact that he can be relieved by a relatively safe procedure, he will seek relief early, with the result that many conditions which occur secondarily to obstruction will be greatly diminished in number. I am under the impression that the number of cases belonging to this group, i. e., those having secondary lesions, are less common in my last 100 resections than they were in the first.

The following table shows the incidence of associated lesions in the genito-urinary tract:

ASSOCIATED GENITO-URINARY PATHOLOGY

| | |
|---|---|
| Diverticula of Bladder | 79 cases |
| Bladder Calculi | 33 " |
| Carcinoma of Bladder | 21 " |
| Prostatic Calculi | 21 " |
| Kidney Calculi | 15 " |
| Ureteral Calculi | 5 " |
| Papilloma of Bladder | 5 " |
| Solitary Kidney | 2 " |
| Abscess of Prostate | 1 case |
| Horseshoe Kidney | 1 " |

The incidence of the presence of diverticula in this series was 12 per cent. A diverticulum may be recognized by means of cystoscopy, cystography, and one sometimes sees a diverticulum in the intravenous urogram. A routine cystogram is made in each case unless an intravenous urogram is made. The cystogram often shows the presence of a diverticulum when least expected. The presence of calculus in a diverticulum was encountered in one case.

*The Management of Cases with Stones in the Bladder.* Stones in the bladder were found in 33 cases. In the treatment of these cases the following 3 modes of procedure were used:

1. In the group of cases with only one or with several small stones, without infection, or with only a mild degree of infection, litholapaxy was done at the end of the resection.

In cases of small stones associated with severe infection, attempts were made to control or clear up the infection by means of an indwelling catheter so that a litholapaxy might be done before the resection. In some of these cases the catheter failed, therefore a suprapubic cystotomy under local anesthesia was necessary.

2. In cases with larger stones the litholapaxy was done first. This was followed by indwelling catheter drainage for a few days; then the resection was carried out.

3. In 11 cases the size of the stones necessitated cystotomy. No attempt was made to remove these stones by litholapaxy as it is my opinion that it is better to remove very large stones by

cystotomy and not to subject the urethra to 2 periods of prolonged instrumentation. The suprapubic cystotomy was done at once irrespective of whether or not infection was present.

*Tumors of the Bladder and Prostatic Obstruction.* In 26 cases a tumor of the bladder was found. In 21 cases the tumor was definitely malignant, and in 5 cases the growth was diagnosed as a papilloma. Benign papillomata were resected and the base fulgurated. The same treatment, namely resection and fulguration, was employed in carcinomata. Attention should be called to the fact that great care should be exercised in the carcinoma cases so as not to carry the resection too far and the fulguration too deeply. In one case there occurred a leak at the site of the resection of the tumor with a resulting pericystitis and death of the patient.

*Hydronephrosis.* Although intravenous pyelograms were not made routinely in every case, they have this in their favor that occasionally they disclose an unsuspected hydronephrosis. There can be no doubt of the fact that this condition is present more frequently than we think it is. (Fig. 1.)

*Residual Urine.* As a general rule the amount of residual urine is an important determining factor for or against resection. A large or relatively large amount of residual urine is always a clear indication that there is an obstruction which should be removed. I have found, however, that there is a group of cases in whom the residual is very small—perhaps only an ounce or two—and yet the symptoms of obstruction, such as pain, frequency, and difficulty of urination, are so pronounced as clearly to indicate a need for resection. The advisability of resection is verified in the majority of these cases by the fact that the patient has failed to respond to local treatment, such as heat per rectum, hot sitz baths, and sedatives.

*The Presence of Infection.* Bacteriological studies of the urine are part of the routine study in every case. As is to be expected, a patient who has obstruction and residual urine often has infection, especially if the obstruction is of long standing and the

patient has had previous instrumentation. Therefore, the necessity for preliminary treatment to clear up the infection cannot be too strongly emphasized.

In this series routine bacteriological studies showed the following:

BACTERIOLOGY

| | |
|---|---|
| B. Coli | 197 cases |
| B. Coli Hemolyticus | 15 " |
| Staph. Albus | 142 " |
| Staph. Hemolyticus | 12 " |
| Staph. Aurus | 3 " |
| Strep. Hemolyticus | 15 " |
| Strep. Viridans | 1 case |
| B. Proteus | 15 cases |
| B. Pyocyaneus | 7 " |
| Eberthella | 2 " |
| Total | 409 " |

*Preparation of the Patient.* The preliminary treatment of the prostatic patient concerns itself with the relief of the residual urine, the control of the infection, and the improvement and stabilization of the renal function.

In the preliminary treatment of this series of resections, the following procedures were used:

| | |
|---|---|
| 1. No preparation | 211 cases |
| 2. Massage and irrigation | 62 " |
| 3. Indwelling catheter | 331 " |
| 4. Suprapubic cystotomy | 41 " |

1. No preliminary preparation was needed in 211 cases. I wish to emphasize again the fact that careful preparation of the patient is just as important in resection as it is in surgical prostatectomy. I am of the opinion, however, that, as one's experience with resection increases and one becomes more and more proficient, and, as the number of patients who seek relief early increases, so will the number of patients increase who may be operated upon without preliminary treatment.

Given a patient whose heart and lungs are in good condition, in whom the kidney function is good, the urine free from infection or showing only a few pus cells, and in whom the residual is 5

ounces or less, a resection can be performed without catheter drainage.

2. Massage and irrigations were used in only a very small number of the cases and these were during the early period of our resections.

3. All cases in which the residual urine is more than 5 ounces, in which the infection is severe, and in which the renal function is impaired, are given the benefit of preliminary catheter drainage. Attention is called to the fact that the bladder decompression must be gradual in cases with a large amount of residual urine and with impaired renal function. The question of whether or not bladder irrigation should be used during the period of catheter drainage depends upon the amount of pus in the urine and the rapidity with which it clears up under catheter drainage. If the urine does not clear up rapidly, we resort to bladder irrigation with either potassium permanganate or silver nitrate. During the period of catheter drainage fluids are "pushed". This will be discussed under the treatment of impaired renal function.

4. In this series 41 cases were prepared by suprapubic cystotomy. However, I am resorting to suprapubic cystotomy less and less frequently, every possible attempt being made to avoid it. Nevertheless, when it appears that it would add to the measure of safety, or when catheter drainage fails to accomplish its object, I do not hesitate to resort to suprapubic cystotomy. Failure of urethral catheter drainage may be due to urethral pain and discomfort, the development of profuse urethral discharge, urethral bleeding, the onset of chills and fever, and stones in the bladder.

The following case is an example of a patient who was admitted to the hospital with an indwelling catheter, having had his bladder decompressed elsewhere. After forty-eight to seventy-two hours of catheter drainage, the patient developed severe chills and fever,

a condition that demanded suprapubic cystotomy as a preliminary measure.

R. R. (physician) aged 76 years, entered the Presbyterian Hospital on February 13, 1935, wearing an indwelling catheter that had been inserted before he came to the hospital.

*Present Complaint:* For 7 years the patient has been obliged to arise 3 times at night. During the last 6 months he has voided from 6-10 times at night. He has had several attacks of severe hematuria. Frequency of urination, dribbling, pyuria, and lack of force in urinary stream have been present for from 6 months to 6 years. Six months ago he noticed a large persistent suprapubic tumor. He entered another hospital where an indwelling catheter was inserted and the bladder decompressed.

*Physical Examination:* A well-developed man, who impressed me with his extremely pale color. There was some hypertrophy of the heart—no murmurs. The liver was palpable.

*Rectal Examination:* Showed an enlargement of the prostate. No signs of carcinoma.

*Blood Examination:* Upon admission showed reds, 4,000,000; whites, 18,700; hemoglobin, 48 per cent.

*Blood Pressure:* Systolic, 132; diastolic, 166.

*Blood Chemistry:* Urea nitrogen, 103.4; creatinin, 217; nonprotein nitrogen, 124.8.

*Phenolsulpholnephthalein Test:* Showed a total output of 8 per cent. in 90 minutes.

*Urinalysis:* Showed albumin, pus, and a few casts.

*Roentgen Ray Examination:* Showed a stone in the bladder, a diverticulum, and stones in the prostate.

It was decided to treat the patient by pushing fluids, indwelling catheter, and blood transfusion. Two transfusions were given, one on the day following his admission to the hospital, and a second two days later. In spite of the indwelling catheter drainage, the urine

continued to remain very purulent, blood chemistry showed an increase in the retention products in spite of treatment, so that on March 4th a suprapubic cystotomy under local anesthesia was done, the stone removed, and a Pezzar catheter inserted into the bladder. Following the operation, the patient's tongue became very dry, he was greatly confused, and it was evident that he was suffering from renal insufficiency.

The following table gives the results of the studies made of this patient's kidney function, showing the great impairment of function:

| Date | P.S.P. | Urea N. | Creat. | N.P.N. |
|---|---|---|---|---|
| 2-14 | | 103.4 | 2.7 | 124.8 |
| 2-18 | 8% | 75.0 | 4.1 | 107.2 |
| 2-19 | 8% | 125.0 | 3.4 | 195.1 |
| 2-20 | | 138.0 | | |
| 2-26 | | 110.8 | 3.1 | 193.6 |
| 3-4 | Suprapubic Cystotomy & Removal of Stone | | | |
| 3-7 | 5% | 135.1 | 5.4 | 163.2 |
| 3-9 | | 124.0 | | |
| 3-11 | | 111.1 | 4.6 | 137.0 |
| 3-18 | 8% | 86.9 | 3.3 | 114.6 |
| 3-25 | 3% | 76.9 | 3.0 | 106.0 |
| 4-1 | 10% | 56.8 | 2.9 | 76.4 |
| 4-8 | 12% | 38.0 | 2.3 | 63.2 |
| 4-13 | 15% | 36.6 | 2.1 | 65.2 |
| 4-15 | Transurethral Prostatic Resection | | | |
| 4-17 | 13% | 68.2 | 3.2 | 92.3 |
| 4-23 | | 60.0 | 2.9 | 89.5 |
| 5-9 | 20% | | 2.3 | 63.0 |

The impaired renal function was treated with blood transfusion, the administration by mouth of large quantities of fluids, the use of normal salt solution, alkaline solution, and urinary antiseptics.

Transurethral resection, under sacral anesthesia, was performed on 4/15/35. The suprapubic catheter was removed nine days later.

The patient was discharged from the hospital on 5/15/35.

*Renal Function.* The importance of a careful study of the renal function requires no emphasis at this time. Resection should never be performed until the renal function, if impaired, has been restored to normal or stabilized. The two most important procedures are bladder drainage and the use of fluids. The amount of fluid intake in the individual case may vary from 3,500 cc. to 5,000 or 6,000 cc. This may be taken by mouth in the form of water, milk, buttermilk, tea, coffee, egg nogg, soups, and other forms of liquid food. Occasionally a patient cannot

take large amounts of fluids; in these instances hypodermoclysis, proctoclysis, or very rarely, venoclysis should be instituted.

*Hemorrhage.* As one's experience with resection grows, and as one strives more and more to control bleeding, hemorrhage becomes less and less of a problem. I endeavor to have the patient return to his room or the ward with no bleeding, or when the wash has only a faint pink color. In other words, I am firmly convinced that by exercising care and patience, the operator will note bleeding less and less frequently. I have had but one case in which a suprapubic cystotomy for control of hemorrhage was necessary, and this occurred early in the series. However, in some of the patients, no matter how dry they apparently were when sent back to bed, the urine remained more or less blood-tinged for twenty-four hours.

Secondary hemorrhage, occurring on the tenth to fourteenth day was evidenced in 18 cases. But it has never been very severe. Clots, when present, were evacuated with the Bigelow aspirator and the bladder was washed out with a warm solution of silver nitrate or potassium permanganate. In most of the cases this was all that was needed. In case the bleeding still continued, the resectoscope was introduced and the bleeding point either fulgurated or excised.

There were 13 cases of late secondary bleeding which occurred at periods varying from three months to one year after resection. I had heretofore assumed that this untoward occurrence was due to infection in the prostatic bed; but recently I have had the opportunity of examining 2 of these cases and found that there were enlarged vessels in the prostatic area and around the neck of the bladder. These were destroyed by fulguration, and so far there has been no recurrence of the bleeding.

*Incontinence.* Much has been said and written about the dangers of incontinence following resection. In a few instances there has been a slight lack of control for a short period of time. There is one case where there is still lack of control when the patient coughs or strains, but he has perfect control at night, and the

slight incontinence on coughing or straining is definitely better at the present time than it was.

*Vasectomy.* The question of vasectomy is still a moot one. Opinions in regard to this procedure are divided into two groups: Those who perform routine vasectomy in every case at the time preliminary treatment is instituted, i. e., when urethral catheter drainage is done, and those who never or very rarely perform vasectomy. During my first resections no vasectomies were done. In this group of cases, 15 per cent. developed epididymitis. This was followed by a period during which vasectomy was almost routine, i. e., it was performed in every case in which permission was obtained. At the present time, vasectomy is not done as a routine procedure.

*Mortality.* Of great interest to the members of this association and the various companies they represent is the mortality in any sort of disease, as well as the mortality associated with any surgical procedure. Therefore, I am sure you will be interested in a consideration of the mortality following this new surgical procedure. There is no doubt of the fact that the mortality in resection is much lower than it is in surgical prostatectomy. To a consideration of this lower mortality rate must be added the fact that many of the patients upon whom transurethral resection is performed are bad risks. For example, there are many patients sent in for the operation who, for various reasons, are in such bad shape that they cannot be operated upon. The fact remains, however, that although many more "bad risk" cases are resected than are subjected to open surgery, yet, despite this handicap, the mortality is very much lower for transurethral resection.

In this series of 734 resections, there were 27 deaths—a mortality of 3.67 per cent. In one series of 184 cases there was but one death—a mortality of .54 per cent. In this case death was due to a stroke of apoplexy after the patient had left the table and had been placed upon the cart.

Dr. Wells—That was a very interesting paper. Discussion will be opened by Dr. Oswald S. Lowsley of this city. When

I asked the Doctor to discuss this paper he very kindly accepted, saying—"But I don't know whether you will want me to discuss it. I don't always agree with Dr. Kretschmer". I think I told him it was a difference of opinion that made horse races.

DR. LOWSLEY—It is a real honor and pleasure to be here, and it is particularly instructive. Before I continue I wish to say that Herman Kretschmer has been my real buddy for twenty years, and anything that I might say has absolutely no personal element in it, and if we disagree it is because, as he says, he likes them blond and I like them red-headed.

In the first place I wish to say that the introduction of this new methed of treating enlargement of the prostate is decidedly beneficial to our branch of the medical profession. Even those who are slowest in taking up this new method, or less enthusiastic, I might say, because we all took it up about the same time, must frankly and freely admit that the method has a decidedly beneficial aspect in certain types of cases.

I think that there are several types of prostates which should not be treated by this method. In the first place a patient who is suffering from the evident effects of pus and the prostate has been decided as the focus of infection, should not be operated upon by this method, in my humble opinion, because one cannot get all of the prostate out, and no one pretends to get all of the prostate out, as Dr. Kretschmer has already told you. Therefore, if you have a focus of infection which is causing distress to the patient in one form or another, it seems to me unwise to tunnel the prostate, leaving portions of it with the infection, some of which has been sealed off. If we utilize the method in such cases we are reduced to the same thing we went through with tonsils, clipping the tips of the tonsils off and sealing infection into the organ, instead of allowing it to drain out or removing it en masse.

In our Clinic we have had hard luck with large prostates operated upon in this manner. We find that we have to re-operate upon such patients, as Dr. Kretschmer has pointed out. In fact, some of the most enthusiastic representatives of the group of

urologists who do this operation in nearly every case, have had to operate upon such large prostates as many as eight times. They will be operated upon twice by great urging, but eight times, they object to. Dr. Kretschmer mentions two, and if he is able to get some of the large prostates out in two sittings I again take off my hat to my friend.

I agree with him about carcinoma of the prostate. I think every carcinoma that can possibly be resected should be resected and radion seeds implanted. There is a definite reason why this operation is successful. The carcinomatous prostate is leathery and one tunnels through the leathery carcinoma and the tunnel stays put, but in an adenoma you have a big prostate in an elastic capsule, and after the tunnel is made the elastic capsule contracts and pushes the tunnel full of tissue again, so that in one or two cases we attempted we had to operate on the patient a second time before he left the hospital, due to the fact that the adenoma was pressed into the tunnel by the elastic capsule of the prostate.

We think that there are certain types of enlargement of the prostate which can be treated thoroughly well with massage, dilatations, instillations, and hot rectal douches, and that no operation at all is necessary. As a matter of fact, I have several cases coming to my office now with great big prostates who have been carried along, one of them as long as twelve years, without any operation at all. The criterion for operation of course, is whether the man has residual urine or not, or whether he is being seriously poisoned by the ever present bacteria that occur in all adenomatous prostates.

In other words, we take the attitude that we should fit the operation to the patient, and not fit the patient to a particular type of operation.

I am delighted that Herman Kretschmer has done all of these cases and has done only one open operation out of 700 plus operations. I think that is splendid. He has done it so well that his mortality is enviable. But take us by and large, we are not as adept as that. We do not get such good results.

There are several great advantages in this operation which Dr. Kretschmer has pointed out, and which we agree with thor-

oughly. One of the patients does not fear the operation so much, and therefore we get him earlier. Another one is that the hospital time is diminished, etc., in suitable cases.

I wish to urge everyone doing physical examinations, and I wish you gentlemen to urge your doctors in the field, to do a rectal examination whenever they make a physical examination of anyone, not only old men, but young men as well, because it really should be done. It is a very important matter, and you would benefit your insurance losses on certain occasions decidedly by doing so.

We always have a medical man in consultation on every prostate upon which we operate, and we always have an electrocardiogram because the thing that we fear most of all is the breaking down of the circulation after the stress of any kind of an operation upon the prostate, and we desire to be backed up by a medical man before we subject these old men to any type of operation.

It is a very strange and interesting thing that in many cases diabetics will be relieved of their spilling over of sugar in the urine after a prostatectomy. I do not know what the explanation of that is, but it is certainly true that it happens too frequently to be an accident. There must be some sort of connection, and it is a fertile field for some bright young man to do a good piece of research work.

I wish to state again that we heartily agree with Dr. Kretschmer in the two-stage operation. There is no reason why a prostate should not be removed by a resection after a suprapubic cystotomy. In our Clinic we get the lowest mortality rate by doing a two-stage perineal prostatectomy when it is indicated. We do not hesitate to do one-stage perineals. We do a suprapubic by the one-stage and two-stage method, and resections by the one-stage and two-stage method.

That brings up the point that the actual technic of the operation is really the least important point of any operation on the prostate. The most important part is the proper preliminary preparation of the patient. That is the thing which the urologist has taught the whole surgical branch of the medical profession,

and that holds good for this new operation as well as it does for the older types.

I will state that we do approximately 25 per cent. of our cases by this method. We do the majority of our cases by perineal prostatectomy because our mortality rate is better using the perineal prostatectomy, and after all, we are interested in the welfare of our patients and we are going to do the thing that we do best for them.

Regarding the operation itself, intravesical, intraurethral removal of the prostate, we have had, as has Dr. Kretschmer, every conceivable complication on the operating table. Dr. Kretschmer had two postoperative cases in which he reported an explosion of the gas, producing rupture of the bladder, which he immediately recognized and repaired, but that has taught us all. So part of the technic of this operation is to let the gas escape, which it does in the form of smoke.

We have had cases, as he has, of rupture of the bladder either at the table or afterwards, by necrosis of the tissue, so that there was extravasation of the urine and pericystitis, and we have had primary, secondary and long-delayed hemorrhage. In fact, this operation is subject to all the complications, both at the table and postoperatively, that prostatectomy is.

It has been a great pleasure indeed to see Dr. Kretschmer's statistics, and I wish to say in closing that I know of no urologist in this country, or abroad, who writes so much, and such good urology, as Herman Kretschmer.

Dr. Wells—I am going to apologize to Dr. Lowsley for the fact that his name does not appear on the program, but we received his acceptance too late to include him.

We were to have a further discussion of this paper by Dr. Donald B. Cragin, Medical Director of the Aetna Life Insurance Company. I am very sorry to hear that he has just received a telegram from his Police Department that his home has been broken into and everything is upside down, so he had to go right back. "From him that hath shall be taken". Dr. Robert L. Rowley, I believe, is going to read his paper for him.

Dr. Rowley—Dr. Wells and Members: Lucid description of any treatment of old diseases, either medical or surgical, is always interesting to insurance medicine. Any procedure which tends to reduce morbidity or mortality must necessarily intrigue us. However, it is also necessary for us to remember that in the past some procedures which were hailed with considerable enthusiasm have not always been the success that was predicted for them and, therefore, we must always be interested to look over the past before venturing too rashly into the future.

Some of us can remember the real agonies of the battle which was fought thirty or more years ago over the question whether the perineal or suprapubic route was the sine qua non of operative attack on enlarged prostates. At that time surgeons went into most meticulous end results regarding the length of time it took for a wound to close, the question of frequency of urination, control of the bladder, etc., which also served to show their increasing skill as operators by their gradually diminishing mortality. The general surgical mortality used to be about 21% on the average with the exception of a few highly experienced operators who managed by skill and possible selection of patients to keep their mortality around 6%.

At the present day the battle seems to hinge on the question of whether the cautery punch or the high frequency current proves the least damaging to surrounding tissues.

The combined mortality of the old operation was too high and remained so and until studies of kidney function, back pressure on the kidneys, infected residual urine, pre-operative drainage, nitrogen retention, excretion tests, urea or sulphate clearance tests, creatinine, etc., plus a study of the cardio-vascular-renal system showed that many cases formerly doomed to failure could be gotten into shape for operative procedure and again the mortality began to lower. The next step was to reduce, if possible, the time of stay in the hospital and with the advent of electrical engineering studies plus the inventive genius of a number of young surgeons full of enthusiasm and capabilities of deep research, there began to be developed several instrumental devices, singly and in combination, which finally resulted in the highly specialized

instruments which are on exhibition at the present time. It behooves us as insurance Medical Directors to encourage the efforts of these men but at the same time to restrain the impetuous by presenting as rapidly as possible mortality studies showing just what may be expected of the average surgeon in the average hospital of the average city.

The clinical application of any technique must be worked out by honest, thorough students like our reader and the question of what type of current to use—whether the high frequency, the coagulating, the thermo-cautery, or the cold knife—is best. Controlling the depth to which one should go and the amount of tissue to be removed in relation to other surrounding structures requires the utmost skill and it seems to me as I read the various papers which have been written in the past three or four years the undercurrent criticism which runs through all these papers is to the effect that after the first 100 cases a man's mortality ought to be pretty good if he has any degree of skill. Just keep this in your mind in picking your surgeon.

To one interested in the history of the development of this type of surgery I would refer them to a paper written by Dr. Caulk in "Surgery, Gynecology and Obstetrics" for February, 1934. Apparently the textbooks in surgery have had more or less trouble keeping up with the rapid advance as I find merely brief allusions to the technique in some of the most recent books.

The facts as presented by our reader in regard to morbidity as well as mortality are interesting but we must remember that a considerable number of patients who are subject to operative procedure are beyond the normal insuring age. Of course, the feature of the disability clause in these cases is one to be considered and on which at the present time I am not prepared to make any particular statement although I do believe that eliminating the moral hazard, a man could come off disability payments shortly after an operation such as described by Dr. Kretschmer. It might be a different matter to persuade a jury that a person who had been subject to a prostatectomy was not permanently and totally disabled.

In looking through the literature I do not find that there is yet a solid front in favor of the trans-urethral operation; for example: One operator frankly states, "This method of resection offers the prostatic no better ultimate prognosis than he had with prostatectomy done by competent surgeons." Another one says that he still feels that large benign hypertrophy should be treated suprapubically or by perineal enucleation. Dr. Hugh H. Young still stresses the perineal route and his punch operation and when it comes to mortality the English surgeon, Mr. Fryer, in 1911 reported 1,036 operations with 57 deaths—a 5½% mortality—and notes in the course of his remarks, "In only one case has the patient failed to regain the power of voluntary micturition." Mr. Fryer was a particularly painstaking man and very thorough in whatever he did. So far as the criticisms of the operation are concerned it is always well to remember—and this point is stressed by a great many writers—that a total vasectomy almost always is necessary to prevent epididymitis and one always has to be on the outlook for other urinary infections. Dr. Kretschmer has touched upon the complications post-operative so there is no need of my saying anything further about those.

Now from the insurance standpoint, it is practically impossible to throw into combination the statistics presented by the various writers as they are all approached from different angles. It might be possible for persons interested to get up a medico-actuarial questionnaire to be sent to the various surgeons and hospitals and this followed up for a period of years might give us a working background.

There are no insurance figures available in the 1925 study. A group too small to be of much assistance is found in our own Company's study. It is so small that I don't wish to even quote it as it might be wrongly interpreted.

It is indeed a pleasure to hear a paper of this sort from as distinguished an operator as Dr. Kretschmer and we certainly appreciate his coming before us and hope we may have the pleasure of hearing him again some time.

In closing I want to quote a delightful little paragraph from one of the earliest workers along this line. I am sure that those

who have studied this subject at all will recognize the gentleman. It just about expresses the opinion that I had formed after what reading I have been able to do along this line:

"Frankly, if I had never done a resection but were considering it from a swivel chair standpoint, after a perusal of the vast literature on the subject, I should be much inclined to sink my spurs deeper into the desk and beatifically resolve to pass the buck and see what would happen in another five years."

DR. WELLS—We all know more about prostatic troubles than we did before these gentlemen spoke. Have any of you any questions that you would like to ask?

DR. PIPER—Recently in Chicago we have come in contact with two cases of prostatic calculi. In both cases the urologists had given a very favorable prognosis. I would like to ask Dr. Kretschmer if he will make some comment upon the presence of prostatic calculi in men of favorable age—51 or 52—and what the terminology in such cases might be.

DR. BIRCHARD—When these cases that apply come along, a very considerable proportion of them have a varying degree of pyuria; they have more blood cells than normal in the urine. If they have fewer blood cells than normal, do they have cholesteroluria? Would that have any significance of longevity?

DR. ALVAREZ—I was very glad to hear Dr. Kretschmer say what he did about this new operation because, to my mind, it is one of the greatest things that is common to the elderly man. In my opinion it is a tremendous advance. As you all know, in the old days the operation for the removal of hypertrophied prostates was a miserable thing, and dangerous. No matter how able the operator, there was always a fairly high mortality attached to it.

During the last few years at our Clinic in Rochester our men have been doing this new operation almost entirely. I haven't seen the latest figures, but I remember one series of about 700

cases where there were six deaths, and every one of these deaths came at the end of about a month. Naturally, if you keep 700 old men around the place for a month, a few of them will go out with a stroke, or coronary thrombosis, or something. As far as I could see, there wasn't much excuse for saying that the operation caused these deaths, but because the men died before they left Rochester, we charged the deaths up to the operation.

I think this is a big thing which should help the insurance business in preventing many, many deaths. I was so impressed one day with hearing Dr. Cabot, who spent much of his life doing the old operation, say that today he considered doing that operation was malpractice. As I said the other day, it is rather hard to find a surgeon so fine and so honest that he will promptly say that what he has done most of his life is malpractice. I don't know of any statement that could be more vivid than to show how a man who has done the old operation feels about the new one.

Dr. Rowley—We have histories in our insurance work of inflammation of the prostate, the symptoms and every indication of that trouble having disappeared. What is the likelihood of further trouble with that prostate, and is a prostate with such a history any more likely to have hypertrophy than a prostate without such history?

Dr. Wells—Dr. Kretschmer, will you be good enough to close the discussion?

Dr. Kretschmer—I think the decision to ask my old friend Dr. Lowsley to open the discussion was a very wise one because, as he said, he does not agree with me, and any discussion in which there is no difference of opinion really isn't a discussion. Of course in any discussion of a problem in which there is not yet unanimity of opinion, both sides of the problem should be presented. Dr. Lowsley told you that in his Clinic they do 25 resections and 75 prostatectomies. Merely a difference of opinion!

You all know, of course, that it was the difference of opinion between Columbus, who said the world was round, and others who said it was flat, which led to the discovery of America, and as our friend, Dr. Wells, says, that makes horse races and bets on the World Series.

Dr. Lowsley said there was one patient who had eight resections. I certainly believe it. The greatest number of resections I have done on any one patient has been three. One man had a prostate that filled up his small pelvis, and it was necessary to do three resections. We told him that we were doubtful of the fact that we could do it in two. Of course, you must bear in mind that this is a highly technical thing. I wholeheartedly disagree with statements made in the literature by a great many men that this is a simple thing. It is the most difficult thing that I have ever tried to master, except golf, and I have not yet mastered that. In other words, the idea seems to be that this is a simple thing to do, and you do it in your office. For instance, I had a man drive up from Cairo, Ill. (which, as you know, is on a level with the southern end of Kentucky) in a "Chevy". He came to my office at noon and wanted to be resected so he could go back home that night in the old "Chevy".

It is very difficult to do, technically, and if someone buys a resectoscope and uses it without being familiar with the topography of the urethra, that man, I believe, will have to do a resection. In a few instances we did three. One of them was a carcinoma case. Two or three of them were unusually large cases, and one was a patient who had had two resections elsewhere.

Dr. Lowsley made a very significant statement when he said that you must not fit the operation to the patient, that you must fit the patient to the operaion.

I have assumed a position in my own mind that I wish to determine for myself the value of this procedure and its limitations, and when I have established that in my own mind I think I will go back to surgery, or do something else, but I believe the only way to evaluate any surgical procedure is to do it yourself, and become familiar with it, and then you know whether or not you can use it in every patient.

I wish to agree with Dr. Lowsley about making routine rectal examinations. It certainly is unfortunate that patients are not examined per rectum as much as they should be, and in my paper I stated that it seems to me that part of your examination of all males who apply for insurance, who are 40 years of age, should be a rectal examination, and that you should have, somewhere in your blank, the result of the rectal examination. It is very easy to elicit a history of urinary obstruction, and when a patient has urinary obstruction, just do a rectal and determine whether or not he has residual, and you will save your company a bad risk.

The question was raised about insurability after resection, and I knew that somebody would ask it. I have no answer to that question because the time that has elapsed has not been long enough to determine that. I think five years hence that question can be answered, because, as one of the speakers has stated, only by accumulating this evidence can there be an answer to the problem, and, as someone else mentioned, these men of course are beyond the insurable age. However, some men have large prostates in their early fifties, and for various reasons, when they reach fifty-five or sixty, may want insurance, and there should be some accurate figures available. When one collects figures, it is well to bear in mind that we cannot all do the same thing equally well. When you evaluate figures you should take into consideration the fact that some of the figures as published are figured from the inexperienced men as well as from the experienced ones.

We have been interested in diabetic patients, and I think the reason that the diabetic patient spills sugar is because of the infection. I remember before the days of insulin we prepared the patients and tried to get them sugar free; then they would develop some intercurrent infection, such as an epidigymitis, pyelitis, acute prostatitis, or a cold in the head, and all of our preparation went to naught because they would then spill some sugar. I think it is in part due to the element of infection.

As I said before, the technic of this operation is difficult. Every time I have written a paper on this subject, or talked, I

have tried to stress the fact that it is difficult. It is not simple; it is not an office procedure. Complications are very many.

Dr. Lowsley referred to two explosions that I had. All through the country there are patients who had holes burned in the rectum, holes burned outside the bladder, and holes burned into the peritoneal cavity, and patients died of peritonitis. That is due to lack of experience, lack of training.

Someone said something about vasectomy. In the paper you will read my views on vasectomy. In the first hundred and some odd cases we did no vasectomies. Fifteen per cent. developed epididymitis. Then for a long time we did routine vasectomies. I have gone back to the position of not doing routine vasectomies and our incidence of epidigymitis now is very much smaller, probably because of our being more familiar with it and working a little more rapidly.

I agree with Dr. Rowley that selection of cases reduces surgical mortality, but in this group of cases I have made no selection. We have not refused to operate upon anyone for any reason. Of course, if you want to build up fine surgical mortality statistics you let your assistant or resident do the fellow you think is going to die, and you do the one you think will not die. That is an old trick, as you all know. It is very important, as Dr. Rowley emphasized. He raised a question about the amount of tissue to remove. I think that in some of our early cases in which it was necessary to do a second resection it was due to the fact that we did not take out enough tissue. Dr. Lowsley told you that when you get out the middle lobe, the lateral lobes fall in. You must remove all of the obstruction.

The question has been asked about prostatic calculi. Prostatic calculi are divisible into two groups,—large calculi that make trouble, which of course, should be treated by a perineal section, that is a perineal prostatectomy; and the small stones which you find in young men of forty, for instance, and who have been referred to me several times by insurance examiners. Patients come in and you routinely X-ray them and find small collections of sand in the prostate. I have always taken the position that those were harmless, that they did not cause trouble, but they

might make a chronic prostatitis, or maybe the chronic prostatitis make these small stones or sand. If these particles of sand agglutinate the patient might have a large stone, and you might have to operate, but I think experience shows that the number that have to be operated upon is very small.

I don't know the significance of a few pus cells in the urine and persistence of cholesteroluria after prostatectomy. We have some of those patients and they seem to get on very well. Occasionally, of course, if the pyuria increases, the patient may have an infection and develop a stone. Stones form, as you know, following prostatic removal, and also following transurethral resection. We have had three of these.

I think if a man empties his bladder, has no urinary symptoms, has a few pus cells in his urine and a mild cholesteroluria, that he is a pretty good life insurance risk. Those are my views about that.

I agree entirely with what Dr. Alvarez says, of course. Many of these old patients, if you keep them around your hospital or clinic long enough, will die of some other thing that has nothing to do with their illness.

The question was asked about inflammation of the prostate making trouble and leading to hypertrophy. When people apply for insurance the examiner always wants to know about the significance of pus in the prostatic strippings. This refers not to the old man with prostatic obstruction, but to the young man. I have always advised the insurance people and the doctors that the individual needs heat per rectum and massage, and nine times out of ten, if that individual is treated accurately and carefully, and over a long period of time, you can get those strippings to show only a few leukocytes, and I see no reason why he is not a very good life insurance risk. A subject in whom infection of the prostate is not cleared up may have distant points of infection, such as neuritis, arthritis, heart valve, or what-not. I believe all of the applicants with infection in the prostate should be cured before they are given insurance.

I do not believe, and I think I express the sentiments of most urologists, that infections in the prostate lead to hypertrophy.

In other words, because a young man had an infection in his prostate at age 40, that is no reason, when the question of insurability comes up, to take the position that because he had inflammation he is going to have hypertrophy. I don't think it makes any difference at all, from the standpoint of insurance, whether a man has or has not inflammation of his prostate, if you clean it up.

DR. WELLS—You will all concur that we have had a most interesting morning. Luncheon will be served in the East Foyer, and we will resume the meeting at two o'clock.

## AFTERNOON SESSION

DR. WELLS—We are greatly honored in having as our guest speaker this afternoon one of the world's foremost anthropologists. Time would hardly permit us to even mention his numerous contributions to literature and science, the various honors which have been conferred upon him both here and abroad, or the extent to which he has delved into the realm of research. The Doctor will address us on a subject relatively new to most of us, yet very closely connected with the work in which we are engaged. It is with great pleasure that I present Dr. Franz Boas, who for the past thirty-five years has been Professor of Anthropology at Columbia University. Dr. Boas has chosen for his subject, "Conditions Controlling the Tempo of Development and Decay".

# CONDITIONS CONTROLLING THE TEMPO OF DEVELOPMENT AND DECAY

By Franz Boas

I venture to bring to your attention a number of observations regarding the life span which I hope may be of interest to you.

The life span is usually understood to be expressed by tables of expectation of life; but this is not what I mean to discuss. I wish to exclude all deaths due to infections, contagious diseases and accidents, and consider only the life span that we should find, if the strength of the organism were allowed to exhaust itself and death would occur as a result of senility.

Even here certain allowances have to be made, for we may distinguish between a hereditary, purely biologically determined element and another one that depends upon conditions of life. Ample or deficient nutrition, more or less exhausting daily labor, abuse of the body, greater or lesser nervous strains are elements that modify the life span as it may be determined by heredity. Even geographical conditions may have their influence. Tropical or temperate climate, the degree of humidity, altitude, all have their influence upon the life span. It is, therefore, impossible to speak of the life span of an individual as determined absolutely by hereditary constitution. It must always be understood as the result of a hereditary constitution subject to a given set of environmental conditions. Therefore, even in a population of the same descent, the life span will depend upon social and economic conditions.

A closer examination of the problem shows that the simple statement that a certain length of life may be expected for an individual of known hereditary character and living in a known environment does not exhaust it. The life span is the result of physiological processes that go on throughout life and that have to be observed from the time of birth until death. When we study the distribution of moments of the occurrence of definite physiological changes, it appears that the variability of the time of

occurrence increases with great rapidity during life. Measured by standard variations, the period of pregnancy has a variability of a few days, the appearance of the first teeth of a few weeks, the time when puberty is reached varies by more than a year, the time of menopause by several years, and death by arterio-sclerosis by more than seven years. These rapid increases are not the same for different types of physiological phenomena. The teeth, for instance, behave quite differently from the skeleton. All, however, show the characteristic rapid increase in variability. This may be due to one of two causes. Either the increase of variability may be due to a high degree of variability of the changes which occur during a given interval without any relation to the time when a previous stage is reached, or the given interval may have a marked correlation with the time when the previous stage has been reached. If the former is the case, it would be impossible to predict the future, if the latter we may be able to predict the course of the life span. It is, therefore, of fundamental importance for the understanding of the life span to determine whether there is any correlation between the rapidity of physiological processes during life.

Unfortunately it is very difficult without a somewhat rigid organization to follow individuals from birth to death. Continuous observations on individuals are most easily obtained during school life, and I have asked myself the question whether during youth there is any evidence of a consistent speed of physiological changes. The observations show clearly that such consistency prevails. Following young children of six years up to maturity it may be observed that growth is completed earlier for tall ones than for short ones, both for boys and girls. During adolescence all children show a decided increase in the speed of development. Among girls this occurs earlier than among boys. This sudden spurt is followed by a rapid decrease in the rate of growth. Among young children, those who are tall have the spurt earlier than those who are short. Tall girls have their first menstruation, on the average, earlier than short ones. The criterion of size of young children is not as clear as might be desired, because some children are tall because they are accelerated in

development, others are tall because by heredity they belong to a tall strain. It is, therefore, more instructive to compare all those who have the period of maximum rate of growth at the same time. Then it appears that the whole growth period for those who mature early is condensed. The bodily growth occupies a short period and proceeds with great energy. The reverse is true of those with a late spurt. They develop slowly and the whole period of growth is extended. The same observation may be made on girls arranged according to the time when they reach maturity, but it is not quite so clearly defined, because the relation between sexual maturity and bodily growth is more indirect. It is, however, evident from all the material collected that the period of bodily development is a unit which in some individuals proceeds rapidly, in others slowly.

The next important question to be decided is whether this unity of the rate at which the physiological life process runs on is determined by heredity or by the influence of outer conditions. The latter may be proved by a number of observations. Many investigators have shown that the average stature of European populations has increased considerably since the middle of the past century. Previous studies do not show us how this change comes about, whether it is a result of speeding the process of development and of an incidental final increase, or whether it is a general rise of the standards for each age. So far as the material collected to date allows us to judge, there is a speeding up of growth which brings about very great differences during the growth period. These differences decrease when growth begins to slow up, but result in a somewhat higher stature of the adult. The groups compared were measured, the one in 1910, the other in 1935. It would seem that the changed conditions result in a change of the tempo of development. In other words, we find here proof that the tempo of the life cycle in youth may be strongly modified by conditions of life. I do not venture to speculate on the causes that may underlie these changes, for it is not apparent that the social and economic conditions of the groups concerned have changed noticeably during the interval of 25 years. The only other series known to me is one of measure-

ments of children in Jena[1] in Germany; one taken from 1878-1880, the other in 1921. This shows also a considerable increase in stature among the children measured in 1921 notwithstanding the malnutrition of the preceding years. It is not convincing because during the interval Jena had become an industrial center which attracted people from a distance. Since the native Thuringian population is markedly short, the country in a wider environment taller, I was inclined to ascribe the difference to the differing ancestry of the two series. The phenomenon observed here in New York in a more homogeneous group indicates, however, that conditions similar to those prevailing here may have contributed to the increase in stature.

These observations conform with the experimental results of observations on rats. Between 1912 and 1919 Gudernatsch[2] administered dried endocrine glands to successive generations of white rats. He observed that the feeding of dried thymus gland brought it about that the animals treated were healthy, had numerous pregnancies, large litters and long life. Recent work by L. G. Rowntree, J. H. Clark, and A. M. Hanson[3] showed that injections of thymus extract (Hanson) accelerated the rate of growth and development, hastened the onset of adolescence in the offspring of the treated rats and increased the fertility of parent rats. It is still more interesting to note that the acceleration is much greater in later litters of the second generation and is more marked in each succeeding generation under treatment. Omission of the injection in one generation caused the loss of all these changes. Analogous observations were made by Dr. Otto Roth.[4] There is still some doubt as to the active principle that causes the acceleration. Both the experiments on rats and the observations on man show clearly that the tempo of development and the ultimate size may be influenced by outer conditions.

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1. Robert Rössle and Herta Böning, Das Wachstum der Schulkinder, Veröffentlichungen aus der Kriegs und Konstitutions Pathologie, Vol. 4, part 1, 1924.
2. Max Hirsch, Handbuch der inneren Sekretion, 1930. Chapter: Entwicklung und Wachstum.
3. Archives of Internal Medicine, Vol. 56 (1935) No. 1, pp. 1-29.
4. Zeitschrift für Morphologie und Anthropologie, Vol. 33 (1935), pp. 409-439.

Nevertheless, the importance of hereditary determinants may not be neglected. Many attempts have been made to investigate the correlations between the ages at death of parents and children, and it has been found that a fairly marked positive correlation exists. The same is true for members of a fraternity. The material is not quite convincing because it is difficult to eliminate complex social causes and to confine the cases strictly to death due to senile degeneration. I have investigated the question in how far the tempo of development of one member of a fraternity may be repeated among other members of the same fraternity. The data prove that a child tall for its own age will have brothers and sisters who mature early, while others who are short for their own age will have a slow tempo of development. The data were obtained from an orphan asylum, where all the children were under the same environmental conditions, so that external influences, if any, were very slight. This also agrees with observations made on animals. Pearl[1] particularly has raised from a mixed series strains differing materially in life span.

All these observations may be summarized in the statement that each individual has by heredity a certain tempo of development that may be modified by outer conditions. The gross, generalized observations available at the present time suggest that in a socially uniform group the tempo of development may be considered as an hereditary characteristic of individuals.

The data which we have at our disposal end with the completion of growth and the important question arises whether the characteristic tempo of the individual extends over later periods of life; whether a rapid tempo of growth will also be associated with rapid decay and earlier death, or whether other types of relation exist. Unfortunately it is quite impossible at the present time to obtain adequate data which, as you will readily observe, must be based on long continued observations of the same individual. If we can obtain the coöperation of the proper authorities such data might easily be secured from the officer corps of

1. See for instance The Biology of Death VI, The Scientific Monthly 1921, pp. 143-162.

the Army and Navy and in similar organizations that require periodic health examinations.

We owe the knowledge of data in regard to later life to Dr. Felix Bernstein[1] who proved by means of life insurance records that an early onset of presbyopia is associated with other early degenerative processes which lead to an earlier death by arteriosclerosis. I do not doubt that many records of death in the archives of Life Insurance Companies could by appropriate search be associated with the growth curves of individuals. Private schools which keep such records remain in touch with their graduates, and by means of proper organization, policyholders among them could be found in sufficient number to give the required information. Furthermore, since we know that the tempo of development is hereditary we might investigate the degree of presbyopia among the parents of children whose growth curve is known. This might also be secured with the help of private schools.

The general problem of the tempo of physiological processes in relation to the life span is certainly not only of theoretical interest, but may also enable us to predict with increased accuracy the expectation of life even in early years.

DR. WELLS—It was impossible to have galley proofs of Dr. Boas' paper in time for reference to discussants, but Dr. Louis I. Dublin, who has followed the Professor's scientific research from the time he was one of his students, and Dr. Walter C. Alvarez will give us a discussion.

DR. DUBLIN—Gentlemen, you have heard what I believe will prove to be a historical document in the records of this association. Professor Boas is a man of very great distinction. As your chairman has told you, Professor Boas has been a leader in American science for fully forty years. He is a former president of the American Association for the Advancement of Science and is a member of our National Academy of Science. The

1. Zeitschrift für die gesamte Versicherungs-Wissenschaft, 1931, Volume 31, p. 150.

leading scientific bodies, in many countries, have honored themselves by making him a fellow or corresponding member. I say this to you, gentlemen, in order that you may fully appreciate the authority with which he speaks.

Professor Boas has, to my knowledge, been at work on this problem of the relation of the rate of growth to longevity the better part of his whole lifetime. Over thirty years ago, when I was one of his students, he was already at work on the problem which he has presented in the paper he read to you this afternoon. He has been collecting data over this long period and has published monograph after monograph on many phases of growth and development, a subject which he understands better probably than any other man living today. His researches began early to point definitely to practical conclusions which he was the first to recognize. I well remember, some fifteen years ago, when he told me that the results of these investigations might be of value to the insurance business. And at that time he appealed to me to help him bring these investigations to a head so that, as early as possible, use could be made of them in this field in which we are all engaged. I have, of course, been tremendously interested in this work. I have not only read and studied the reports of his investigations, but I have kept in touch with the related investigations of others, notably those of Dr. Felix Bernstein. I say to you, without hesitation, that we simply cannot afford to ignore what is going on in these laboratories of Professors Boas and Bernstein. I know of nothing more important for our business than what these men are doing.

What is it essentially that Professor Boas has said to us? First of all, he cited the familiar fact that we grow up in a very definite way, that people vary in their physical make-up, for example, in stature, in weight and in build. This leads us to his main point that they vary also in their tempo of development. We know, for example, that some children develop faster than other children. They reach puberty earlier. We know, too, that menopause comes to some women much earlier than to others. Now it is Professor Boas' theory that the tempo of development in the individual acts like a unit character; that evidences of it

may be seen not only in childhood and adolescence, but that there are manifestations of it in adult life. Professor Boas' researches seem further to indicate that individuals in whom the tempo of development is rapid "work" out their lives at a quicker tempo and that these individuals are probably the short-lived persons. On the other hand are those who have a slower rate of development and these probably live longer lives. All of this, of course, is not yet proved, and is still in the realm of theory, as Professor Boas frankly admits.

Professor Boas' work has received wide attention of scientists and has served to stimulate other scholars in the same field. Of outstanding importance, in this connection, are the investigations on presbyopia of Professor Felix Bernstein, formerly of Göttingen and now in America. Presbyopia, which is measurable with considerable accuracy, seems to be one of the characters which reflect the tempo of development. Professor Bernstein's studies indicate that those with a sub-normal presbyopia for their age live longer than those with a super-normal presbyopia. The difference in expectation of life at age 40 was found to be nine years in a group of persons observed by Bernstein.

The work of these men needs to be confirmed and extended. Let us suppose, for the moment, that further investigations confirm these results and that we would then have some simple procedure for determining significant physical change in the individual applicant, that the medical examiner in the field could use and which would give us an index indicating that one applicant is of a type that lives long, that another is of a type that lives less long. What a gift of the gods that would be to the life insurance business!

That is why I say today that we, in the life insurance business, and especially the medical directors, have an extraordinary opportunity to serve not only the public welfare but our own. While there cannot be any guarantee of the final outcome of these studies, the indications, I believe, are sufficiently promising for me to recommend very strongly to you that steps be taken to get the life insurance business squarely behind these investigations, and that we should express our interest in these studies in a

substantial way by giving it financial support and close attention. Our interest in the work is a guarantee that it will be done well and competently. The amount needed from us is comparatively small, and properly prorated among the companies would be negligible for any one of them. In my judgment, a contribution of $10,000, the first year, to make possible the organization of the work and the appointment of a full-time investigator, and possibly $5,000 a year for two additional years would be sufficient for the life insurance companies to give. I have every reason to believe that our contribution would be matched by one of the great foundations which are supporting medical research projects.

I feel very strongly that the insurance companies, and very properly through this association, should contribute to this work because there is potentially so much of direct value to us in the selection of risks. I sincerely hope, therefore, as a result of this meeting today you will find it possible to take some action to sponsor the further and final investigations of Professor Boas, and to support them in the practical and effective manner I have outlined. Thank you.

DR. ALVAREZ—I don't want to bore you having to listen to me too often, but one of my hobbies has been physical anthropology because I believe that the solution of many of our problems in medicine should begin with a study of normal man. I was just saying at luncheon today that I deal with the gastric juice. We physicians have pumped stomaches for at least fifty years, day after day. Do you realize that until two or three years ago, when I got an assistant to study some six thousand or more records of gastric juice, culled out of sixteen thousand apparently normal human beings, we ourselves had no standards, but your books told you they were 60 and 40! That is approximately true for men in the middle age; it is not true for older men, for women, nor for young people. We finally worked out the curve. That was done after fifty years of stomach pumping, which is typical of medicine. We haven't the remotest idea of what the normals are. You get a red cell count from your laboratory. Do you know what the limits of error are on that count? We have found that

even with trained counters it can very often be a million or half a million either day. These are some of the things we have to know. So I am intensely interested today.

I feel as Dr. Dublin does, that we may be sitting in the presence of making history. Ordinarily when history is being made no one notices it at the time, but I hope we notice it this time. The work, to me, is very suggestive, and as Dr. Dublin says, "the spending of a little money might bring you rich rewards".

As someone says, we start dying at twenty. You can make out a thesis that we really start dying before that. Certainly we start dying about the time our growth is finished, and we keep on dying steadily until this immortal soul leaves us.

Now it seems to me very logical that we sometimes will get yardsticks to show us the rate at which we are dying. We are all dying at different rates. I am dying at a certain rate; you may be dying at a different rate. What is the index of that? You know our blood pressures may give you some index as to the rate of our dying. Presbyopia is another very suggestive measure. Another one in which we are becoming more and more interested at our Clinic is the study of the small retinal vessels. You know you can look right into a man's eye and see those vessels, see how hard they are, and what they look like. We find that is a tremendously important thing in deciding what is going to happen to a man with hypertension. What is more, you are looking at some of the blood vessels of the brain because the optic nerve is not a true nerve, it is one of the tracts of the brain; it is out there and you can see it and you can see its blood vessels and get an idea of how that man's brain is going to die.

Then there is another thing—the question of weight. Take for instance, myself. Ever since I was 16 I weighed 157 pounds, until about two years ago, when suddenly, without any change in my diet or anything, I weighed 165. Now, I am 165 in spite of anything I can do. What is going to happen? Was that a good sign, or was it a bad sign? What does it mean? You men ought to know. It is a sample of the thing we ought to know, you and I both. Change in sexual power—men are dying in that

way all the time. There is the man who burns out at 40. Does that mean anything in regard to the time when he is going to get into his coffin, or doesn't it? Change, for instance, in teeth. Here is a man whose teeth are all gone when he is fairly young, and he had a good dentist and went to him. What does that mean compared to the man who had all his teeth, as I saw the other day, at 70? Then gray hair. We know that probably doesn't correlate with early disease.

I read somewhere that a man who has a skin cancer early is likely to live long because he won't have internal cancers. I hope it is so, because I myself have had two or three burned off already.

Then the amount of driving is probably an important thing. Different men have different drives—such as a drive to work—and I think that is probably a tremendously important thing.

Then we may some day find that we can tell when a man is going to die by the state of his bones after X-raying them, just as we obtain the best evidence of the rate of growth of a child and determine what his actual age is. The best way is to study his epiphysis with an X-ray. Then again a study of the rate of growth of his nails or hair might teach us; or a study of the rate of his pulse, a study of his metabolism, or a study of the absorptive powers of the gastro-intestinal tract. I just happened to think of these as I sat there listening to this paper. Probably if we sat and thought we could get a dozen others. All of them would be nice jumping off places for research, which might pay you men millions in the course of a few years.

Dr. Wells—Professor Boas, will you close the discussion?

Dr. Boas—I am very much obliged to Dr. Dublin and Dr. Alvarez for their remarks, and I confess I feel somewhat embarrassed because I did not bring the paper here exactly for the purpose of asking for assistance, but I do feel that the problem itself is one of very great importance. It requires a certain amount of organization in order to be carried through to a success. If I looked at it from a purely theoretical point of view I

should say the ideal thing to do would be to establish some kind of a center in which we could start with the relation of individuals and follow them carefully throughout life. This could be done to a certain extent, in some occupations, but it would be a matter of very great length and since we do know that there are certain heredity traits, it is possible to facilitate the investigation by comparing children in fraternities. I believe that results really worth while could be obtained in a very short time.

DR. WELLS—The concluding paper on our program is one which I think is of very great importance. It deals with the medical examiner. We must all admit that the report by our medical examiner is the basis for our selection. If that report is not true what happens to our selection? Or, if it is not true, how does it affect the statistics on these various diseases? The subject is very important, and the paper is to be presented by Dr. Walter E. Thornton, Medical Director of the Lincoln National Life Insurance Company.

# SOME MEDICAL RELATIONSHIPS OF LIFE INSURANCE

By W. E. Thornton, M. D., Medical Director
*The Lincoln National Life Insurance Company*

The term "life insurance medicine" is a useful phrase. It has appeared not infrequently in the "Proceedings" of this Association and in other authoritative insurance publications. You will no doubt agree that the medical profession in general do not appreciate its scope. I would not care at present to word a definition, but it is proper to my theme to indicate some characteristics of the activity to which we refer in using the term.

You will recall that up to about 1850, risk appraisal was in the charge of a board often chiefly of lay members. The applicants appeared in person before them and were judged mostly by their appearance and deportment. Some few direct questions of medical nature were asked, but on the whole the selection was based on personal inspection and was made by laymen. This might be called the Lay Inspection Era of risk appraisal.

The mortality record of those early life companies demonstrates that inspection had and therefore still has important selection value.

At the end of the lay inspection era, the medical examination blank was, to our modern eyes, a crude and primitive affair. But with increasing recognition of the mortality effect of physical impairment, it came to be by far the most important single document so far as risk selection was concerned. In this increasing importance, the office of the medical director shared. The best director was he whose natural capacities, long training and wide experience placed him in the first rank of clinicians. The closing years of the last century were the heyday of formal medicine in life insurance. It marked the Era of Clinical Selection. At the height of the period, this Association was formed. Its early records carry the characteristic clinical flavor.

Extensive quotations from the authorities both of the basic sciences and of formal medicine and accounts of individual cases encountered in practice, were typical. The methods of determining rules of selection were by deduction, analogy and adaptation from clinical pronouncement and experience. It was a philosophical rather than a scientific procedure.

This portion of the panorama is noteworthy first because, when no more trustworthy guide is available we must still revert to purely clinical principles, second because we revert also to determine where and in which direction the more modern insurance research methods shall be applied, and third because the general medical profession (including the vast majority of our examiners and even the medical departments of some companies) is still unshaken in the conviction that insurance risks should be appraised upon purely clinical grounds, and that no other than purely clinical principles should or can properly be involved.

However, those early papers undeniably foreshadow the coming epoch in that they show a partiality for statistical material. It is obvious that data of this nature gives more valuable direction. Other influences paved the way. Selection judgments based only on clinical training and experience proved to be inadequate. They were erratic and irregular within the same office and lacked uniformity as between companies. They reflected the prejudices and temper of the moment and were based on concepts and opinions that were neither sufficiently sound nor sufficiently discriminating. That these were serious defects became increasingly apparent with the great expansion of our business, during the period, and with the beginning interest in substandard insurance.

The work of Dr. Rogers and Mr. (now Doctor) Hunter of the New York Life was under way at the turn of the century. Their methods of medico-actuarial investigation and the numerical system which we owe to them, are brilliant masterpieces of competent, vigorous and sustained coöperative effort. So also are the activities of many other men and companies in supplying the data and the study which have resulted in our present highly practical and equitable means of appraisal. This evolution has involved a realignment of previously quite distinct realms of

thought and activity—the medical and the actuarial. It has not been a mixing but rather a complementation of them. The distinguishing characteristics of our modern insurance medicine are a result of these mutually interacting influences.

A proper name for the present would seem to be the "Medico-Actuarial Era" of risk appraisal. It is quite as distinct from the Era of Clinical appraisal as that period was from the primitive era of selection by lay inspection. Another method of saying the same thing is to state simply that there are significant differences between the medicine of life insurance and the medicine of clinical practice.

### Life Insurance Medicine and Clinical Medicine

Some of the differences are inherent in the nature of the insurance business and were as effective in the last century as in this. Others are the hallmarks of our progress. It seems proper to list those most relevant to our argument,—

*The Medical Director is once removed from the applicant.* The information upon which we base our appraisals as to physical status comes through the Medical Examiner and the attending physician. There is thus lost the personal touch so characteristic and so valued in clinical medicine. The examiner and the medical informant are intermediaries who may be weak links or strong links depending on many things.

We bolster the links by insisting upon direct questioning and by using various forms including the medical blank. But though we can control *what* is to be asked, and *what* is to be observed, we have not been able adequately to control at many critical points, *how* the answers and the observations are recorded. It is a salutory exercise for students of selection to observe the limitations of language to convey exact meanings. Let them try, for instance, to intensify or to minimize the significance of a murmur, in neither instance violating the truth. With a little practice the effect can be made little short of amazing. Note that the effect is aside from the ever present question of honesty and dishonesty.

There are influences constantly affecting the physician's wording. Of importance are first his sympathies whether wholly with

the applicant, which is common, wholly with the company, which is rare, or equally divided between the two, which is desirable. Second his judgment of the mortality effect of the item being recorded, and particularly his opinion of the company's supposed attitude on the point and his respect for our knowledge, ability and fairness in appraising the factor. A most powerful influence I place separately for emphasis—whether or not he will be penalized by agent or applicant for good work and honest reporting.

*Insurance applicants are not often willing witnesses.* The doctor sometimes does not realize that the frame of mind differs as between patients and applicants. The one unburdens every detail, the other is apt to be forgetful, veiled, brief and minimizing.

*We are concerned predominantly with "pre-clinical" states.* Insurance deals with healthy people and to a less extent with those suffering from ailments usually classed by both physician and public as "minor," "physiological," "functional" or "theoretical." Impairments are usually of a degree for which the public does not generally consult the physician, and are therefore not commanding in clinical experience. The additions to mortality are relatively slight—not sufficient to be recognized by the limited prognostic resources of clinical medicine.

*The concept of the group as a mortality unit* is the most characteristic of all the distinctions since there is little or nothing in clinical medicine to correspond with it. The actuaries taught us its value. I do not think they appreciate how difficult it is to medical thought. The doctor, from his first medical inclination to his latest professional call, thinks in terms of the individual patient. The clinical system is so arranged that its every resource can be marshalled for the benefit of the single sick person. All its revered traditions and high ideals are in the same sense intensely individualistic. Our practice of simply classifying an individual, dissolving him in a group so that he loses his identity, and administering to him routinely and indiscriminately the dose assigned to the whole group without respect for individual variations (which the doctor can always find) seems to the clinical mind to be lacking in justice and to be much inferior to his in-

dividualizing. No one is more familiar with the uncertainty of individual human life than is the physician, but the constancy of mortality behavior of large and homogeneous groups is a phenomenon, the usefulness of which he has had no occasion to grasp. He has a vague concept of what he calls the "law of averages" and in an amateur way he interprets the tabulations of the medical publications, but he does not trust them far and in general he is in agreement with the lay public concerning the three kinds of lies—ordinary lies, damn lies and statistics. He has never heard of the laws of Poisson or of Bernoulli and he is distrustful and suspicious of our use of the group principle especially when it appears to him to violate his medical concepts.

However, the fact remains that expert observation of suitable groups to determine the mortality effect of impairment is a prognostic method of a sensitivity not approached in purely clinical medicine. It follows that if we are to have subclinical groupings we must have subclinical group indices, in other words, we have standards which are of great importance to us but which do not appear in the clinical texts. Examples of these subclinical standards will occur to you—the sulpho-salicylic acid test for albumin and Benedict's picric acid test for sugar, the miscroscopic procedures recommended by the Committee on Medical Impairments of this Association, precision of height, weight, pulse and blood pressure determinations and the importance of the method employed especially in blood pressure.

Such fine discrimination is quite unnecessary in clinical practice. The profession is uninformed as to the reasons for it, is skeptical of the necessity and is therefore inclined to be careless in the determinations and recordings involved. It may be that the frequent reporting of a pulse of 88 does not mean that an actual count of 88 was obtained in each instance. The figure may be simply a symbol of the doctor's judgment of a "high normal" rate. Similarly the frequent blood pressure reports of 120-80 may mean "I am satisfied that the blood pressure is normal."

Perfect group homogeneity in practical everyday risk appraisal is a statistical dream. As Dr. Wilson argued in 1931, our official heart group "without hypertrophy" should be "hypertrophy not

noted"—a very different thing. The same defect applies to almost all our groups. But I believe we can do better in this respect if we will bend every effort to an improvement in the quality and quantity of information upon which we classify our risks. I believe this is the most clearly indicated single advance for the immediate future, and I believe the route lies through improved relations with the general medical profession and with a better grade of examiner.

*Purely business considerations are of relatively much greater importance* in insurance medicine than in clinical practice. The formal medical studies do not include courses in the principles and practice of business. Indeed medical tradition and idealism has more than a trace of contempt for it. It is therefore considered by the profession as something inferior and perhaps undignified. Our concern of it is not seldom annoying to them. The doctor is conditioned to recognize and respond reflexly to the urgencies of clinical practice but without further training he cannot be expected to appreciate the necessity for promptness in the insurance business. He does not believe that a little delay may jeopardize a policy and it does not occur to him that our applicants may under any circumstances have priority rights to his professional attention. In past discussions of the subject we have assumed that professional attitudes and business requirements are immiscible. I suggest that this assumption is not warranted and that had we a really effective means of influencing the physician we could not only convince him that the dignity and ethics of our business are quite worthy of his respect but we could also supply him with a background upon which he would more often evolve the tact in insurance work that is so valuable yet so poorly developed.

We have noted the nature and significance of some outstanding differences between clinical medicine and modern life insurance medicine. Certain of their identities also must be emphasized. That they have common bases in anatomy, physiology and pathology is self-evident. But thorough medical training, keen powers of observation and diagnostic acumen are also common factors.

Another identity which we must stress is the identity of medical ethics. It is not necessary to labor this point before this group, but it must be consistently and forcibly upheld before our lay confreres. We must disabuse their minds of the notions widely held that ethical considerations are outmoded remnants of medievalism or that they are the bulwarks of a brand of trade unionism. We must press upon them that our ethical code is a system of dealing with delicate and personal matters, which is of such intrinsic merit as to have survived centuries of application to every conceivable combination of circumstance. It is the teaching of a myriad of medical experiences and is a safe and very practical guide in a difficult terrain. The ethical complex is so completely established in the average and the better grades of the profession, that a breach of it is the most odius of all conduct and the quickest and surest method of disrupting confidence in us. To the lower grades of the profession it may not make much difference, but it is to be recalled that the value to insurance of the doctor's confidence and respect varies directly as does his professional level. Only the interest and service of the higher grades of physicians will give us the quality and quantity of information concerning our applicants, that will result in improved group homogeneity.

Our claims, legal and above all our agency departments are the worst offenders. They are apt to treat medical information—obtained in confidence—as a commercial commodity to be used or abused to any advantage without adequate ethical restriction. The handling of medical reports by agents is an example. Correspondence with the profession by laymen is another, although my department holds that a properly selected and trained senior underwriter has quite as much if not more claim to professional standing than has a nurse and that the profession will recognize him when the matter is properly placed before them. However, it remains a fact that some of our insurance laymen seem to think that because fees have been paid and because done in the magic name of "business," any liberty may be taken and that the protest of ethical considerations is of no weight. In some instances even executives have shared the view.

If one be permitted to generalize beyond the confines of medicine and of insurance, one may note that too frequent and too flagrant disregard of well known and universally accepted ethical principles has had no small part in the genesis and course of our economic and social difficulties. It has besmirched the fair name of business and especially big business and has supplied effective ammunition to the pinks, the radicals and the "reformer".

But to return to insurance medicine. It is important to recognize what is ethical. It is also of practical importance to distinguish what is not to be included under the term even though clothed in the guise of it. The schedule of fees paid for service is an economic rather than an ethical understanding. The concerted demands of medical societies are of the same nature when they are not purely political. The ethical code has been established a thousand years and more; the economic code has changed almost with each generation; politics is notoriously unstable.

## The Examiner

The examiner is the main source of our information concerning the physical status of our applicants. Upon the quality and quantity of his contribution depends the homogeneity of our current groupings.

Concerning the technique of his selection, I can add nothing of value to the records of this Association. There have been numerous contributions on the subject. That of Dr. Muhlberg in Volume X together with the discussion on it, and further comment in the succeeding volume, comprise a complete text as to this operation. My department believes that the highest grade of man is important. He must be a graduate of an "A" school. He must be in good standing among his confreres as attested by membership in local, state and national medical associations. We prefer the man who classifies himself as an internist. We also prefer the younger examiner on the grounds that he is better trained than his elders, that his intellect is more pliable to grasp and apply the new principles involved, that he is less liable to infirmities of eyesight and hearing, is more amenable to instruction or remonstration and that he is more eager to serve. We employ all the rec-

ognized methods of prospecting for him and investigating him. We frequently make use of a probation period for further observation of his work but in our final selection we are more influenced by professional quality than by business claims so frequently and so strongly urged by the agency.

Most of the companies of the country are operating under the multiple examiner plan. The term covers any system whereby the agent can exert a selection among a few or many doctors authorized to do the work. My company does not use it but through our reinsurance experience we have opportunity not only to observe it in operation, but to compare the results with those of our Chief and Alternate system which I shall describe in a moment. As a result we have formed views which I only wish I might uphold with the vigor we feel warranted. We believe the Multiple Examiner system is more responsible than any other single factor for the low ebb of life insurance examining today. It has preserved the field as a haven for the misfits, the incompetents, the ne'er-do-wells, the outcasts, the failures and the senile. Our noble institution of life insurance has become associated in the minds of the profession with the lower grades of doctors. This is one important reason for a certain contempt of insurance medicine made clear in Dr. Old's 1930 poll of examiners.

The mechanism of the deteriorating effect is quite simple. The agents soon sense which examiner or examiners find the fewest impairments, and are therefore "safest" to use. They know which can be influenced and how the pressure may be most effectively applied. They know which can be induced to examine the heart in a boiler factory, which respond to the threat of boycott, which examine cursorily and take much for granted, which believe that insurance is robbing overweights and blood pressure cases by exacting a rating and may therefore be inclined to shade these figures. High grade work is penalized and low grade work is rewarded.

This sounds like an arraignment of agents. It is not so intended and cannot be so interpreted when one recalls that the conclusions and practices of our agents are those which home office permits. The best and most honest of agents cannot be

expected to act differently under the multiple examiner system. They have good reason to conclude that, since choice is permitted, any grade of appointed examiner is satisfactory. They know that the examination is not a quality one but, since accepted for years, they conclude that the company's practices, mortality and success have been built around it. They think poor medical quality is the insurance norm and therefore the "too strict" examiner is a menace. They argue that compensations for poor examining must exist somewhere in the insurance structure and that these operate unfairly to applicant, agent and to the company itself when more competent, more critical and more honest examining is done. At one time such "compensations" may be said to have existed in the form of high interest return on sound investments and in the margin between premium loading and overhead. The first has all but disappeared, and will stay in eclipse for years to come. The second is now threatened by the tax mongers and by increases in wages and other company costs. Mortality savings through enlightened risk appraisal upon adequate and quality information is the one safety factor remaining subject to our control.

The public also is conscious that insurance examining is a quite incomplete and haphazard affair. When we of home office are complimented by an applicant on the thoroughness and completeness of our home office examination, it is a backhand slap at the medical work done in the field.

In contrast is the Chief and Alternate plan. It is by no means new. In fact it was described in detail before this body just 40 years ago by Dr. Curtis of the Equitable.

These are the essentials,—

1. In any one territory, there are but two examiners, a Chief and an Alternate. Perhaps "Chief and co-chief" are more suitable terms. The names do not much matter, the principle does. These territories do not necessarily correspond with the agency areas. For one agency there may be a number of chiefs, but within his own boundaries he is supreme.

2. Every applicant whose home is in the territory must be referred first to the Chief for that territory.

3. If the Chief is not available, the Alternate may be used but the details of the alleged unavailability must be set forth. These details are then sent to the Chief for his confirmation or other comment. He is also asked for information regarding the applicant. If the unavailability is denied, the case is classed as "irregularly examined," re-examination by the Chief is demanded and the fee for the Alternate's service is paid but charged to the agent's account.

4. A similar routine is followed when examination is made by the Chief for an area other than that of residence. It is surprising how often this handling reveals the real reason for the trip abroad.

The examiner, whether Chief or Alternate is led to appreciate that he may expect security in his appointment so long as,—

1. He shows care, competence, thoroughness and honesty in his work.

2. He is prompt in completing and mailing the forms and specimens.

3. He is courteous and tactful with applicants.

4. He is reasonable in accommodating our clients especially out-of-the-office cases.

5. He remains in the territory.

6. He is under sixty years of age and in full possession of his physical faculties and mental vigor.

The outstanding advantages of the system are,—

1. The examiner is relieved of all pressures except those urging him to give prompt, complete and accurate information in every case.

2. Practically all fees go to one examiner. They are a regular and more or less important part of his economic budget. He values his appointment and is in a proper frame of mind to comply with our demands for prompt service and additional assistance when necessary, to heed our criticisms and to benefit from our instructions.

3. He receives instruction or admonition as the case may be, from a medical man who can best understand the workings of his medical mind and not from the agency who are ignorant of, and unsympathetic toward his objectives and viewpoint.

4. Through more service to our company, he is more familiar with our individual methods and can better anticipate our requirements.

5. The system provides an excellent index of the quality of our agents. It continues our experience that the really profitable agent rarely complains either of a Chief or Alternate and rarely submits an irregularly examined case.

6. Conversely, the system pins a red flag on the crooked application. We suspect every irregularly examined case and we investigate with special thoroughness and care. This is a precaution which has saved us much trouble and much claim money.

7. Most of all it preserves that ethically proper atmosphere within which medical friendships can flourish in mutual understanding and respect as between the examiner and the medical director.

The plan is not without disadvantages.

One drawback is the amount of time required for administration.

### Examiner-Agency Relationships

The most serious drawback is agency complaint, and it is a matter not to be dealt with lightly or thoughtlessly. In each sepa-

rate instance the medical director must assume a judicial function. He must demand real evidence from both sides and he must then adjudicate with justice and firmness.

I have never been quite certain in my own mind as to why field men, particularly brokers and new agents unfamiliar with the system, are as a rule so bitterly opposed to it. I have already noted that our experienced men who are at the same time our profitable men seldom make complaint. From this observation I conclude that it works no hardship on them or on the others either. Whatever the cause, complaints against our good examiners take a definite pattern, study of which gives direction as to a suitable form of investigation and the action to be taken.

*The examiner is tardy* in completing his part or is not giving good service. We require names and cases. We go direct to the papers and compare dates. If there is undue discrepancy we write the examiner, asking for his side of the story. We assert the dignity of business and point out that promptness is an ethic of it. In the case of unwarranted and repeated delay despite our representations we do not hesitate to replace the examiner.

*He is not insurance minded.* One of two things is meant. Most commonly he has resisted the sales efforts of the agent. Less frequently the examiner omits to say that word of approbation, encouragement and congratulation to the applicant that would make easier the agent's job. It is our view that the function of the examiner is neither to buy nor to sell insurance. His function is to collect and report facts concerning physical status. With proper facilities we may be able to induce him to contribute other services willingly.

*He will not go out of his office.* We take steps to make it perfectly clear to the agent that it is the policy of our department to encourage as many office examinations as possible. We explain that quietness, freedom from interruption and those technical facilities of an office not easily transported, are necessary to the best quality of medical work. We ask if the agent has attempted to get the applicant in. But there are doctors who positively refuse

to leave the office on any occasion whatsoever, and there are applicants who simply will not go to the office. In these cases the agency suffers an undue hardship. We write the examiner. If he remains obdurate, we replace him.

*He is too busy.* The examiner is written inviting comment and giving names and dates where applicants have allegedly suffered notable inconvenience by reason of the press on the examiner of other professional duties. The price of these inconveniences to the agent and company is pointed out. If his practice is such that in his opinion he cannot do better, he is delicately but definitely asked to resign.

The *faction complaint* is frequent. The examiner is a Republican or a Democrat, or a Catholic or a Protestant or belongs or does not belong to this, that or the other group. In our experience this is either simply an excuse or it is an agency bogey. Investigation has not revealed marked applicant resentment in any material number of instances. We placate the agent as best we can and do nothing about it. In the more insistent cases we write the examiner setting forth names and alleged details, and we are governed by his reply.

In all these instances so far as the agent is concerned, the rule must be that we assist him so far as lies within our power, our only limit being that we shall do nothing, nor permit the agent to do anything that will limit the quality or the quantity of information upon our cases.

As for the examiner, I am convinced that much of the distrust which we suffer from the profession is traceable to summary dismissals as a result of prejudiced representations by interested parties, without adequate investigation and without opportunity for the presentation of the other side. At other times it is simply a human sacrifice to unwarranted agency prejudice. Our power to dismiss is a two-edged sword to be unsheathed only when we are very certain that our decision is just.

Until the Chief and Alternate system is more widely established, and accepted, agency pressure, at least from new agents and from brokers, is to be expected. The first attack is a frontal assault on

the medical department. Charges and ultimatums of resignation are the ammunition. Next comes a deploy via the agency department which is too often peculiarly vulnerable to this type of approach. Finally the resourceful agent forces the attention of the high executives.

From some experience of the unsuccessful attempts of certain companies to establish the plan, I have come to the conclusion that the following points are necessary to its success,—

1. The whole system must be contemplated. "Modifications" mean multiple examiners.
2. Its details must be rigorously enforced, including the charging of fees to the agent's account in irregularly examined cases.
3. The unqualified backing of agency executives and higher officials even to the point of accepting ultimatums.

### Special Examiners

Modern insurance medicine makes frequent use of specialists in X-ray, electrocardiographic and laboratory diagnosis. It must be recalled that with brilliant exceptions these gentlemen have had no more opportunity to acquire an appreciation of the nature of insurance medicine than have the general medical profession and less than have our examiners. Their attitude toward the clinically minute variations is that characteristic of the profession at large and is inadequate for modern insurance work. Their standards often vary from ours. Further they have had no occasion to undergo the training necessary to acute judgment in risk appraisal. From these considerations we can conclude,—

1. Specialists should be required to conduct and report their inquiries along standardized lines where such have been determined by insurance medicine.
2. X-ray films, heart measurements and the actual electrocardiographic graph should be sent to home office for interpretation. Such expressions as "heart normal in size,

shape and position" or "EKG shows no evidence of myocardial damage" are not enough.

3. Specialists must be discouraged from offering opinions as to insurability. Their influence among agents and applicants is enormous. When their expressed opinions conflict with the pronouncements of insurance medicine, we lose prestige as well as business.

To command these things is liable to be offensive. It is much better policy to instruct the profession, not that they may become finished risk appraisers but that they may know the why and wherefore of our rulings or at least that they will concede the superiority of our judgments within our own field.

### Medical Informants

Turning now for just a moment to our relations with the general medical public. I am satisfied that, speaking generally, we do not go to them as often as we should for our information on our applicants who also are or have been their patients. Quantity as well as quality of information is clearly indicated. Acting under this conviction, it is routine in our office that we obtain a statement from every physician who has treated our applicants within 5 years. This routine is carried out irrespective of the apparent innocence of the alleged illness or injury. From this source we are constantly learning of ratable and declinable impairments which we otherwise would have missed. "Routine physical examination" is the worst offender. It is our experience that there is almost invariably some sign, symptom or history behind the "check up".

We occasionally are disturbed that correspondence from other companies concerning our information from this source sometimes comes to us from legal, claim or other lay departments not apt to be sufficiently impressed with the ethical considerations involved. We have even been asked by these laymen to name the physician from whom we received the information. We could only suspect that a "take up" was contemplated and that our confidant might be involved to his embarrassment and to the

further loss of prestige of insurance medicine among the general medical profession. Surely we suffer enough when our information is obtained by regular legal routes!

### Defects

The relations of life insurance to the medical profession including our examiners are by no means what they might and must be.

There are defects on both sides,—

1. Clinicians, even the authorities are, generally speaking, quite uninformed as to the nature and resources of insurance medicine. The basis and logic of our decisions are not understood and some of our appraisals are therefore held to prove our ignorance of medicine and our injustice to our applicants. Many doctors feel quite justified in "protecting" patient or applicant, hence the quality and quantity of our information suffers. Their opinions as to insurability are incompetent but carry enormous weight with both agent and applicant and when in disagreement with our action, cause us loss of prestige as well as business.

2. We traffic with the lower grades of the profession, due to the defects inseparable from the multiple examiner system. This has resulted in a lower quality of information upon our applicants and incidentally has alienated the affections of the better kinds of doctor. The profession, together with the agents and the general public, believe that inferior medical information is the insurance norm.

3. We have dismissed examiners without adequate investigation which has been interpreted as a breach of faith and unjust.

4. Our influential lay associates have sometimes been careless in matters properly regulated strictly by the rules of medical ethics. This is the most odious of all conduct and one most calculated to convince the physicians that the

medico-insurance relationship is not a professional one but is commercial—a much lower and more careless form of intercourse.

Loss of the respect of our confreres for our beloved insurance medicine is humiliating. Far more serious is the blight that is cast upon the quality and quantity of information we use in our selection and its effects upon the homogeneity of our groups. Modern medico-actuarial selection methods and resources constitute an intricate and marvelous machine for the appraisal of risks but if we feed it shoddy material we cannot except a quality product. Nor can we anticipate sound progress until the defects are remedied.

### Remedies

Corrective measures are more or less obvious,—

1. Examiners must be chosen only from the higher grades of the profession.
2. After appointment they must be protected from all subversive influences. This can be done by the Chief and Alternate system if rigorously applied. I can vouch for its practicability.
3. Our professionals and laymen alike must see to it that the code of medical ethics governs each and every medico-insurance relationship.
4. Instruction of examiners and the medical public as to the what and why of life insurance medicine is of paramount importance.

Perusal of the records of this organization clearly demonstrates that we are unanimous as to the necessity for this last matter of instruction but it also shows that we are dissatisfied with the means to that end so far devised.

The pamphlet or booklet we send to the examiner on his appointment is soon filed or worse, and is seldom studied a second time.

Other literature and even letters share the same fate.

University courses either undergraduate or post-graduate have not had wide appeal to the authorities of our medical schools. In any case it is doubtful if they are or would be of lasting influence inasmuch as at best they are but a brief and minor element in a crowded curriculum.

Local examiners' organizations have, with a few exceptions, failed to thrive.

Medical Societies, particularly the state and national bodies, do not seem to regard the subjects of insurance medicine as desirable program material. The political element is against it. Dr. D. Chester Brown's words to us in 1931 do not deny it.

The formal literature is all but silent. However, it is not quite silent. Occasionally, and I think increasingly, we are credited with valuable activities and accomplishments. This is most encouraging.

The one method which we agree is of unquestioned value is the effort of the medical director in contacting his examiners either by individual correspondence on selected cases or, much better, by personal visits. Most unfortunately, this last method has serious drawbacks: It cannot be widely applied on account of the time and expense involved, at best it is sporadic, uneven and occasional and it contacts only the examiners, leaving the general medical public untouched.

To this list I propose two additional items, both of which take advantage of fundamentals not operating in any of the other plans. I urge a special periodical on insurance medicine for examiners, special examiners and the general medical public. It must carry a quality, dignity and authority worthy of our work, of insurance in general and of the respect of the best of the profession. It must be purchased by the individual, not donated to him by the companies, though I see no objection, but rather every advantage to the employment of the powerful influence of individual company recommendation. I do not propose any particular relationship of this body to such a venture except to insist upon editorial and policy control satisfactory to us. If the Association is unable or unwilling to do other than encourage it, the publishing companies may be interested. Otherwise it might be undertaken as a private

venture to which, under proper circumstances, I should be willing to subscribe.

The immediate field is the forty or fifty thousand examiners who average at least one examination a month. It would carry statement of authentic information, attitude and policy with the continued regularity which pedagogues and advertisers insist is of the utmost importance in any educational program.

My second thought concerns a mechanism to allow self selection of the "born examiner," to encourage a wider understanding of insurance medicine, to stimulate active study of it and to recognize and reward proficiency and accomplishment in it. It may be that a college of life insurance medicine would accomplish these things. Its recognitions must be valued and therefore must represent real study and not simply political acumen. Its associates are admitted only upon completion of a prescribed course and upon real examination. *Once admitted they become preferred prospects for appointments to examinerships.* Upon much more study, with experience in a home office, and through a further test of knowledge, they become eligible for admission to Fellowship. Those among us who are particularly distinguished—you know them as well as I—might well be entrusted with the future of the organization through election for life to a controlling Senate. There must also be places of honor for those who have made signal contribution. Our activities enrich the medical profession of the United States and Canada by from fifteen to twenty millions of dollars a year. If all other elements of the plan are correct this economic force would be amply sufficient to guarantee the influence of such a movement. This is not the time for discussion of possible relationships to this body. However, the attitude of our influential lay executives is most important. We must have their support of both principle and detail.

These undertakings are formidable but so also are the problems. Any solution will involve much thought, planning, labor and responsibility. These are the price of a progress worthy of life insurance medicine. It is unthinkable that we do nothing to correct medico-insurance relationships that are far—very far—from healthy.

DR. WELLS—We felt that this was a subject upon which each one of us had his problems, so we decided that instead of having one or two prepared discussions we could perhaps have a better experience if we asked a few of our members to, in a brief way, contribute their ideas. Will Dr. H. W. Cook, Vice President and Medical Director of the Northwestern National Life Insurance Company, discuss Dr. Thornton's paper?

DR. COOK—I would just like to say a word of appreciation for the paper.

Dr. Thornton has covered this most important subject so very completely that I feel it would be difficult to add anything of material interest, except perhaps in the way of emphasis on one or two points that are so essential but which he has already dealt with at considerable length. In the first place, I do think that we should face the fact that we have very considerably antagonized and alienated the cooperation of the medical profession by methods for which we have been in part responsible during the past ten or fifteen years. I do not appreciate it until I get out in the field, but every time I visit examiners the conversation in each town is generally along about the same line. They say, "You fellows don't want honest examinations. I was chief examiner for such-and-such a company and the agent told me he was sorry, he liked me personally, but if I continued to find impairments and make so many notations on the blank and confuse it so the medical director couldn't understand it, he couldn't continue to use me."

Another point that has antagonized physicians is the non-medical. They do not appreciate we are having a better experience on the non-medical business than on examined. They do realize they are losing their fees. But I think the major factor has been that we are not adhering to our good examiners over agency pressure, when the agent is dissatisfied with a certain examiner on account of the number of impairments he finds.

I agree absolutely with Dr. Thornton that the only scientific as well as practical method of medical selection in the use of examiners is the chief and alternate system. There was a case

in Minneapolis recently that you may be interested in that brought out some of the unfortunate points in the selection of examiners for a large case. This man was applying for over a million. The brokers very carefully selected a corps of examiners to examine for a group of companies. I felt very much complimented that the broker told our home office agency that they couldn't use us because we were very strict on blood pressure, and they knew this case had a borderline blood pressure. They had at first a group of six doctors examine this man. I talked to one of them afterwards. He said, "We found blood pressures ranging from 145 to 155, but after we had had him lie down for a while, one of the six finally got a blood pressure of 138," and apparently they were very much pleased at that, because they all used the figure of 138 and put it in all six of the examinations. The broker brought a copy of this examination, in which the six men had participated, to the chief examiner of another company and said, "Now, Doctor, you know this examiner; he is a high-grade man, and I am sure you have no objection to copying his examination. The applicant is leaving town; you can't see him today; just copy this examination and send it in as yours."

This particular examiner refused the suggestion. The agent took it to another more accommodating examiner, and I saw the $100,000 policy that the Company issued. A third instance in that same case was that the examiner was asked to examine the man in the morning. He was leaving shortly and he couldn't be examined at any other time in the day. When the examiner got there, the man was in bed, and he found a relatively normal blood pressure. Since then blood pressures ranging as high as 178 have been reported.

That is not an exceptional instance. Over and over again at our home office we see cases in which the examiner reports 140 or 142, because he thinks that that will get by, and we find at the home office examination 160 up to 200 with diastolics a hundred or above.

I think we should recognize also that we are not getting from the medical profession at large accurate reports in a very considerable number of cases, and I further believe in many cases

it is our fault. We do not make the profession realize that we want strict, honest examinations, reporting impairments as they find them. Many examiners are fearful, and unfortunately with good reason, that if they do report impairments they will lose their jobs.

I agree with Dr. Thornton that it is not a question of the *honesty* of the agent in a majority of these cases. The average layman does not appreciate the qualifications of a good examiner. In this connection the present tendency in some companies in the selection of examiners and the decision of their retention to drift into the hands of laymen has been a factor. I have the highest respect for lay underwriters. We have one whose judgment I would trust on a great many questions of selection more than I would most members of the medical profession, but in dealing with physicians, the problems are distinctly professional, and I think there we have antagonized many good examiners by sending out laymen to interview them and ask them about their school of graduation and their professional standing, and whether they will give honest examinations, and so forth, and quizz them as you would a clerical employee.

I heartily agree with Dr. Thornton's recommendation in regard to some further effort to educate the profession in underwriting problems. I think we ought to have from this Association, or from the Medical Section of the American Life Convention an essayist at every State Society once a year. It could be done so easily. We should also have papers at many county societies, especially in the larger cities. Data presented at Medical Directors' meetings is of intense interest to the medical profession and is welcome on the various programs. I hope very much that the committee appointed from this organization and from the Medical Section of the American Life Convention will consider Dr. Thornton's suggestion in regard to some sort of a life examiner's college or association and also endorse and circulate a magazine devoted to insurance medicine. The doctors are not reading the little pamphlets that we send them at the time we appoint them. They lose them promptly and never refer to them,

but I think if we had a current magazine of real interest and of a high professional standard endorsed by these two medical directors' organizations, it would obtain a wide circulation and be read and be extremely helpful.

I want again to express my great appreciation of these problems, because Dr. Thornton has presented them with great clarity, and I think the grade of examiner employed is of far more importance to us in obtaining a favorable mortality than some of the distinctions we make in regard to twenty or thirty points in numerical ratings. Thank you very much.

Dr. Wells—Dr. R. R. Simmons, Assistant Medical Director of the Equitable Life of Iowa, as many of you know, has given a great deal of time to the subject of medical examiners, investigation of them, their education, etc. He also has been very active in the affairs of the State Medical Association, and is at present Editor of the Iowa State Medical Journal. I am sure we would all have much profit from some remarks from him.

Dr. Simmons—In our Company we have for some time carried out a progressive and continuous observation of examiners' work by surveying twenty to fifty consecutive cases examined by them. As a result of that we find, in some cases, marked stereotypeness in the doctors' work. The question always comes to our minds as to what to do about them. We doubt very much that these doctors are dishonest; we doubt very much that they are ignorant. We do feel, though, that they are definitely and highly ineffective. I would like the essayist to make some comment about what he does or what he would do with those examiners.

Relative to the matter of dissemination of medical information I heartily agree with the last speaker who suggested that we use the American Medical Journal and the journals of the various state societies for the purpose of reaching the doctors. I think as far as reaching the layman is concerned, we have a wonderful avenue in Hygeia, which is very largely subscribed to by libraries, doctors, nurses, parent-teachers associations and what-not.

I think it would be well, perhaps, to mention also that in most county and state organizations there are committees or bureaus established to provide speakers for medical and lay organizations. We have such a group in Iowa that operates under a speaker's bureau, and that speaker's bureau lists two or three physicians capable of making a satisfactory insurance talk. Now don't misunderstand me—the thing hasn't been used much. The possibility, though, is there. These talks would be given before county medical associations, city medical associations, before lay organizations, such as women's clubs, parent-teachers associations, etc.

I have the feeling that we have the machinery at hand. It is not necessary, in my opinion, to create a new machine to handle a program for the dissemination of this information which we all feel is quite necessary.

DR. WELLS—Dr. Berthold T. D. Schwarz, Medical Director of the Bankers National Life Insurance Company, will continue the discussion.

DR. SCHWARZ—Mr. Chairman, I have been very active in county medical organization affairs. I am in private practice myself. Although my life insurance work is full time, it occupies only part of the day, so I believe I am in a position to know what the attitude of the average medical man is in regard to life insurance medicine.

One of the things that particularly arouses animosity on the part of a large number of the profession is the fact that life insurance companies invariably ask for information regarding the patient of the private physician and expect to get these answers without paying for the service. It is true that there is a particular problem involved in that the information which is given is largely to benefit the applicant as well as the life insurance company. It has been the custom of my own company to offer to reimburse the doctor for whatever expense he may incur. The amount paid has varied, ranging from one to ten dollars, depending upon the kind of an answer we have received and the size of the case, but

invariably the letter we send is so framed that no definite commitment is made as to any fee, and I believe about 98 per cent. of the answers we have received come through without any request or any suggestion as to a fee for the services rendered. There are, however, in that two per cent. group, some exceedingly sarcastic letters regarding this particular feature, and I know they only represent an exceedingly small number of the men who are inclined to give you caustic replies, but instead just swallow down their resentment. This callous attitude of "collect from your former patient" unquestionably is one of the things that alienates a great part of the medical men in giving their full cooperation when furnishing statements regarding the illnesses of their patients.

There is also another thing that has struck me rather forcibly, and that is the lack of literature on prognosis. I believe there are only about four textbooks which are available. Yet, the determination of prognosis is an exceedingly important branch of medicine. It is true prognosis is discussed as a part of every textbook in that it follows up the diagnosis and the treatment of the disease, but treated as an entity there is a marked scarcity of textbooks on that subject—yet life insurance medicine abounds upon this subject in particular. It is perhaps advisable to work in conjunction with the medical profession on these problems, through the American Medical Association, which already has several special departments, such as the Department on Oto-Laryngology, Pathology, and other special branches of medicine, and definitely organized sections of medicine in contra-distinction to the outside organizations, such as the college of Surgeons and Physicians.

Perhaps it would be very expedient once such a committee is appointed here from this Association that the question of creating a section on prognosis in the A.M.A. be furthered and that that particular section also be permitted to give and hold special examinations on that subject and to give certificates to those showing proficiency the same as the specialists in oto-laryngology or ophthalmology receive. In that way you can create a direct in-

terest in prognosis and in life insurance medicine, reaching a greater number of medical practitioners, and carry your message through the journals of organized medicine with greater facility. I think the term itself, life insurance medicine, would alienate attention from a great part of the medical profession. The term "prognosis" however, in its broader aspects, would not only interest men specifically in life insurance medicine, but also in the many other fields of prognosis. The nucleus for the formation of such a section is in the medical personnel of our Life Insurance Companies.

DR. HARNDEN—One is quite naturally complimented to be asked to discuss a paper written by such an able writer and clear thinker as Dr. Thornton.

Reference is made to the term "life insurance medicine" as being a useful phrase. Its utility is unquestioned. Likewise, there is little doubt but that it is much misunderstood by the medical profession in general and sometimes held in little esteem by some doctors in particular.

Clinicians, as a rule, know little and sometimes care less about the work, the constructive work, we as medical directors are doing. This frame of mind is perhaps well illustrated by a quotation from a report made by a committee of which I was chairman in the Medical Section of the American Life Convention in 1931. The remarks were made by an excellent examiner of considerable experience. It was as follows:

> "My observations, and the reactions of my acquaintances, lead me to believe that the warmth of feeling between life insurance companies and doctors in private practice depends on the satisfaction of two needs: the first, the maintenance of the doctor's feeling of importance; the second, the ever-recurring economic one.
>
> "When I first started insurance work, I regarded the business as beneath me. This was not an opinion independently formed but was a reflection of the attitude of those members of the profession with whom I had come in contact. The feeling was that anyone could do insurance work, and that consequently only the beginner or the failure took it up. I quickly discovered the error in my point of view, but I believe the profession as a whole

still clings to it. As a result, many doctors carry a chip on their shoulders, as though defying insurance prospects to insult them.

"I have found this attitude most pronounced in the small towns around Chicago—farther out than the immediate suburbs. No doubt it is true of all small towns. The doctors in these towns have an agreement that they will make life insurance examinations only in their offices. They feel that they will lose caste if they are discovered calling on an individual at his home to examine him for insurance. A young doctor locating in such a town will seize the opportunity to do insurance work, but after he has been admitted to the inner circle, his enthusiasm wanes and with it, his value as an examiner. Like the rest, he looks down on the job he had been so eager to secure.

"One of my acquaintances in Chicago gave up insurance work because many of his calls were on working people. I realized how deeply his ego was wounded when he told me that he would rather drive five miles to examine a business man than five blocks to examine a laborer, although the fee was the same in each case. Another doctor severed his insurance connections because he said he maintained his professional dignity at a higher level by sitting in an empty office reading medical books than by making profitable insurance examinations of people he regarded as socially inferior. These same people as patients would not be so regarded. Another says that 'anyone who does insurance work is prostituting the profession of medicine'. When he makes an insurance call he is not welcomed as the miracle worker who brings relief from pain or consolation to the worried or grief-stricken. Rather is he met at the door with the curtness accorded to a bill collector. Recently, one of the staff men under whom I served an interneship called at my office and, after carefully closing the door behind him, asked me almost in a whisper if I could give him any insurance work to do. He explained that it would not have to be generally known that he was doing this work. This attitude amuses me, but that does not alter the fact that the complex is distressing to those who suffer from it.

"I believe insurance companies are partly responsible for this attitude. To overcome it is the big problem in

improving the relationship between companies and the doctors.

"In the first place, the profession as a whole must be made to feel that any Tom, Dick and Harry cannot secure an appointment as an insurance examiner. The requirement that the doctor must be a graduate of a Class A school and must have served an interneship is only a small step in the right direction. Insurance examining must be raised to the dignity of a specialty. But insurance companies urge that their examiners spend the major portion of their time in general practice! Impossible if one looks upon insurance work practically as a business. We do not demand that our pediatricians or psychiatrists devote most of their days to general practice. If they did they would hardly know the difference between a feeding problem and one of behavior. Of course every specialist should have clinical contacts outside of his own specialty, but these should interest him chiefly as an avocation.

"At first glance this suggestion may seem impractical of application outside of a city. I do not believe that is so. Assume that the gap has been jumped between the present and that future time when both the medical profession and the insurance companies shall regard the insurance examiner as a specialist. A country doctor having secured the necessary training for the specialty, would be used by all companies doing work that a dozen doctors are now expected to do, but which they do poorly because (1) the business of insurance plays such a small economic part in their lives; (2) because they lose prestige through their insurance connections and thereby (3) lower their ego.

"At the present time, nearly every doctor one meets has made a few insurance examinations at one time or another. This should sound as ridiculous as it would to say that nearly every doctor had been an ophthalmologist at one time or another. If that should ever be said, the ophthalmologist would be regarded with tolerance rather than respect.

"The economic problem solves itself as soon as the insurance examiner becomes a specialist. Instead of two hundred doctors casually making five examinations each per month, ten doctors would each make one hundred examinations per month. The difference is that which exists between self pity and self respect."

The conviction that still seems to exist in many quarters, as Dr. Thornton points out, that purely clinical angles should govern underwriting is perhaps also reflected in the joking remark that so many of our general agents make when appearing in the Medical Director's office to discuss a certain case. This remark sometimes is "Well, how are you feeling today? If you're feeling pretty good, why then we'll discuss a case, otherwise we will let it go". Perhaps this frame of mind is not as important as it appears to be, but it still has to be considered.

Sometimes one of the things that is difficult to make plain to the medical profession is what Dr. Thornton refers to as the concept of the group as a mortality unit. Doubtless many clinicians feel as I did many years ago when I first started in the work of medical underwriting. It was difficult to reconcile the fact that the more an individual needed life insurance the less he was likely to get it. However, from the clinical viewpoint, the more he needed professional help, certainly, the more he was entitled to it.

We all have our troubles and grief with reference to examiners. Dr. Thornton is to be greatly complimented upon his courage and forcefulness in establishing and maintaining the Chief and Alternate plan of examiners. Undoubtedly, where there are too many doctors on the examiner list, the work is spread so thin that it is of little interest to any one, consequently, the character of the work is decidedly altered.

Dr. Thornton has very clearly set forth at the end of his paper in "Defects and Remedies" the gist of the whole situation. When we are able to definitely define the defects and satisfactorily apply the remedies, a large percentage of our troubles will be over.

Dr. Eakins—Discussing such a paper as Dr. Thornton's is not only difficult, but it is no fun. It is no fun because there is so little in it about which to fight, so little in it to promote controversy, or argument, or dispute. The difficulty comes in having to agree with a man, which may be polite, and complimenting him, which is conventionally correct. It may be a pleasure to agree and compliment, but it is no adventure. If Dr. Thornton had only said

something to which vital objection could be raised then a windstorm might have been stirred up and we all would have had a good time. So far as I am concerned, personally, he has left me practically flat with little or no hope for flying feathers, nor else, save acquiescence and approval.

It is too bad we were not re-reminded of the well known, and good, and true story of the "Lay Inspection Era" which portrays both modernity and inconsistency. It seems that even before 1770 the lay board, sitting in solemn conclave, would reject an applicant who was not a bottle man as a wishy-washy specimen. And yet they would issue a policy with an extra premium to a gouty individual.

In speaking of medical ethics the statement is made that "it is unnecessary to labor this point before this group." Of that, assurance is not so obvious. Dr. Thornton was very gracious in excluding us from censure. Perhaps my sense of the fitness of things is lacking when the suggestion is made that we should be criticized for not sufficiently upholding the standards of medical ethics. If a physician discusses the luetic infection of his patient with a lay friend, it is one thing, and, it is just about the same thing if an examiner turns his medical report over to an agency representative. Yet that is the "regular routine" of many companies. Being so, it must be tolerated by the Company's Medical Director. Such an assent tacitly permits the applicant's private medical affairs to become public property. Why then let us off so lightly when those of us who scatter information to the four winds are surely guilty of very unethical habits. A simple distinction, incomprehensible to some, is a physician's refusal to give information with one hand and his willingness to throw it broadcast with the other. It may be called an "unorthodox irritation" and the incongruity reflects an I. Q. classification of, say, plus or minus 85.

The internist, or other physician who is not group conscious, as is "life insurance medicine," would become so and have no quarrels with us if he would take to heart a few of the precepts of Hippocrates himself. For example:

1. "There is no authority except facts."

2. "Facts are obtained by accurate observation."
3. "Deductions are to be made only from facts."
4. "Life is short and art is long, the occasion fleeting, experience fallacious and judgment difficult."
5. "To know is one thing; merely to believe one knows is another. To know is science, but merely to believe one knows is ignorance."

It is admitted it takes more than a well peeled eye to read and properly interpret a statistical study. Even statisticians acknowledge that, and to further prove the premise they glory in tearing each others columns apart. However, there are a certain number of fundamental laws which none of them dispute, and given "true homogeneity," dream though it be, the figures tell only one story. Even though our practicing medical brothers are imbued with the "individual" viewpoint it should not require an overly vivid imagination for them to see that a homogeneous group, is an individual. Just as much a sentient entity as is a thing with two legs. Whether they see the point or not, we need not shed salty tears over their failure to do so. Education of them is tentatively suggested. A hopeless task. Never yet was a dray horse educated to be a race horse and, if there are "born examiners," there are "born medical directors" and "born statisticians". You can not convert a finger and thumb counter into a statistician.

Examiner-agency relationships, with medical director complications, confront us all. Some of us skate on thin ice, some are in hot water all the time and an isolated few find only a few thorns in their bed of roses. The last of that mixed metaphorical sequence, a very desirable situation, may be had by the right man in the right place. Let some unknown's triteism be quoted: "Given the right man control is unnecessary; with the wrong man it is unavailing." Another: "He who knows how will always have a job; he who knows why will be the boss." The right man in the right place spells the end of many troubles.

The fear may be a phobia, but the fear persists that a special periodical on insurance medicine would be "waste-paper-bas-

keted," even if sufficiently widely purchased, just as are pamphlets, booklets, and other instructive literature. Individual letters, on specific subjects as they arise, are probably the most valuable educational means at our disposal. And, probably, they will remain so.

A college of life insurance medicine, with its Associates and Fellowships, probably would have a wide appeal not only to those who are inherent joiners, but, more to the point, to those who take their examinerships seriously and have ambitions to excel.

DR. WELLS—Dr. Cragin was good enough to prepare some remarks relative to the questions under discussion, but as you know, he was called to his home, and I have requested Dr. Samuel B. Scholz, Medical Director of the Penn Mutual, to read his discussion.

DR. CRAGIN—Dr. Wells and Members: That hardy perennial, the unnamed flower of our annual meetings, is up again for discussion.

Briefly glancing over the literature since 1923 I find that Dr. Muhlberg read a paper in that year showing his method of selection and how brought about and also making a survey of methods in other companies, showing the methods in ten different companies. At this time Dr. Grosvenor appointed a committee to investigate.

In 1924 Dr. C. N. McCloud read a paper before the American Life Convention.

In 1925 Dr. Probst wrote a paper for the American Life Convention and Dr. Wells, our present President, suggested a couple of plans.

After a brief rest of two years Dr. Sykes gave a paper showing the amount spent each year by 81 companies who worked for the same end and made three suggestions of what should be done. That same year Dr. J. B. Jack in the St. Louis meeting of the American Life Convention read another paper from the standpoint of the Medical Examiner in the field.

Dr. Alton made a suggestion in 1928 and Dr. Oscar Rogers congratulated the Canadian companies on their standards and said that so far as the field is concerned the result of their efforts has been magical and the education of medical advisers has advanced a hundred-fold.

Dr. Olds read a very careful and thoughtful paper in 1930. In 1932 at West Baden Dr. Johann read, with his paper discussed by Dr. Thornton.

Glancing at this from a detached standpoint, it seems to me that our friend, Chas. Dudley Warner's remark about the weather is applicable to this situation—in other words, "There seems to be a good deal said about it but not very much done to remedy it."

Some years ago, during the beginning of the late unpleasantness in Germany, I was associated with the Red Cross organization in a small town in Maine and a little incident happened which I have never forgotten. We had a brilliant lawyer in the town and while we were trying to formulate some plan the lawyer would always bring forth at each meeting a new plan. Fortunately, the lawyer missed one meeting and we immediately put through a plan which was adhered to for the rest of the time the Red Cross functioned. At the next meeting our legal friend came in and complained about our ideas, saying that he had a much better plan, and one of our merchants who was a pretty solid sort remarked to the lawyer, "My dear Sir, it has always been my experience that a poor plan well carried out is much better than a new plan every week." I think there is considerable food for thought right there. We have had papers enough. The time has come when we should get together and do something, make a start, carry along with Dr. Thornton's ideas (with which I am in the fullest sympathy), or pick up some of the ideas expressed in the numerous papers read in the past eleven years.

In a recent trip to the field which lasted nearly six weeks I was tremendously impressed and extremely gratified at the apparent interest there is among the physicians at the present time in regard to life insurance examinations. Advance notices of my trip were sent out and I had anywhere from 7 to 90 physicians present at each one of my stopping places and after a brief talk

to them on insurance medicine, which never lasted over 20 minutes, I called for questions. The shortest period following the announcement was one hour and a half and the questions came in just about as fast as they could be answered. One session in particular lasted over three hours and even then the men were asking questions as I started for my train. This does not mean that I have anything out of the ordinary to offer. It does not mean that my ideas of the conduct of the physician in the field are any different from yours; but it does mean that the interest is there, the soil is ready, and with the $123,000 mentioned in Dr. Sykes' paper divided into annual contributions from companies, get a committee that is interested in this matter, and make some sort of a start. We will never get anywhere any other way. Abraham Lincoln said, "If we could know where we are and whither we are treading, we would know better what to do and how to do it." At least we know where we are but whither are we treading. I am sure that keeping on as we are at present is not the best way to carry on for the future. My idea is to have the next paper on Medical Examiners, which is read before any Medical Directors society, one of achievements accomplished toward a definite end. Analyzing the papers read shows that there is very little difference in the general trend of thought and methods of application can always be handled as the emergency arises.

In closing it is needless for me to say that I could take Dr. Thornton's paper and corroborate all he says by pertinent and recent examples. We all can do this. I can't help feeling that there is a sentiment right now in favor of making the start indicated and I trust that before this session is over something will be done.

Dr. Robinson—Dr. Wells and Members: We welcome this type of paper on our program because medical relations in life insurance are of major importance to us and the companies we represent. Dr. Thornton has comprehensively sketched the history of life insurance medicine, dealt with medical ethics, emphasized the important part the examiner plays, referred to the role of the specialist, outlined our relationships with the family doctor

and, finally, he has offered two suggestions which he feels may improve and strengthen relations with our examiners and the medical profession in general.

It is difficult for the younger members of this organization to realize that only thirty-five years ago, medical selection was based practically entirely on clinical judgment. There was no Medico-Actuarial Mortality Investigation or Medical Impairment Study to indicate the exact mortality to be expected on a group of risks with a certain departure from average physical condition. The Medico-Actuarial Mortality Investigation and the more recent Medical Impairment Study are valuable underwriting guides. Of relatively equal importance are the original scientific papers presented before this Association. These studies have had the highly desirable effect of changing underwriting from the "clinical era of selection" to the medico-actuarial method.

We have been trained in the art and science of medicine. To successfully apply our knowledge to the life insurance business, we must readjust our method of thinking in many respects. To the family doctor, the case at hand is his primary concern. While each individual case is important in our business, we must nevertheless think in terms of the group for underwriting purposes. Whenever we have reliable statistical data on a specific impairment, we should apply this experience in preference to our personal attitude toward the impairment. Our natural inclination to individualize in underwriting should be submerged. Scientific medico-actuarial mortality studies tend to change underwriting from a pure art to a science. They have brought about more consistency and greater uniformity of action on the same set of facts.

In spite of the remarkable advances made in insurance medicine in recent years, medical selection is unfortunately not yet a complete science. In fact, medical selection in life insurance probably never will be a complete science, because medicine itself will, in my opinion, always continue to be a combination of science and art. Most of the problem cases we handle today cannot be properly appraised by consulting a manual and adding up the sum total of the debits and credits. Reliable statistical studies covering

sufficiently large groups are few in number and include only the commoner impairments. Studies which deal with the effect of combined impairments on mortality are, unfortunately, still very limited. Consequently, we must pay full tribute to the clinical ability of our predecessors, and emphasize the necessity for sound clinical medicine in both the home office and field, even in present day underwriting. A good medical director must not only possess a thorough knowledge of life insurance medicine, but he should also be a good clinician. Frequently, he must evaluate statements from the family doctor, specialist, or clinic. The statement may reveal a classical description of an organic disease, in spite of which the doctor's diagnosis may be that of a simple functional derangement. Clinical conclusions from every source cannot always be accepted at their face value by the medical director.

Differential diagnosis in present day underwriting is extremely important. Recently, we obtained a history of slight, accidental carbon-monoxide poisoning, which was said to have occurred three years prior to the date of our application. We obtained a statement from a well-known sanatorium where our fifty-four-year-old applicant had been confined for treatment. The case illustrates so well the necessity for differential diagnosis on the part of home office medical departments, that I believe it is worth quoting:

"In October, 1932, Mr. C. was brought to the sanatorium in a police ambulance, semi-conscious, with cardiac arrhythmia and marked prostration. Given caffein and aromatic spirits of ammonia. Blood pressure at first between 150 and 160. Dropped to 110. Improvement, gradual, and extreme prostration gradually disappeared. Blood pressure returned to 150 to 160. Pulse, regular. On third day, blood pressure 170 systolic, 90 diastolic. Suggestion of stickiness at base of lungs. Electrocardiogram showed moderate tachycardia. $T_1$ isoelectric; $T_3$ inverted. Left heart preponderance. The X-ray examination of the chest made shortly after admission to the hospital showed some enlargement to the left, which was attributed to transverse position of the heart on account of a high diaphragm. Three days later, improvement in $T_1$ and $T_3$. On January 25, 1932, approximately three months

later, cardiac mechanism was practically normal, with a fairly positive $T_2$ and isoelectric $T_3$. In May and November of 1933, July of 1934 and January of 1935, the electrocardiogram showed a practically normal mechanism. In conclusion, we are inclined to think that the attack was precipitated by carbon-monoxide poisoning. He was driving a small coupe with the windows closed on account of rain." This statement speaks for itself. It is a good example of the necessity for proper interpretation of information received from the medical profession in general.

Underwriting standards of 1900 would be totally inadequate for the insurance business of 1935. Revolutionary changes have been made in methods of selection, even in the past ten years, and insurance medicine has been alert to take advantage of clinical methods that have a practical application to the business of life insurance. Blood sugar tolerance tests, X-rays, electrocardiograms, kidney function tests and similar studies are of such diagnostic and prognostic value that they are necessary aids to underwriting certain cases today. The interpretation and application of the results of these modern aids to underwriting are dependent on our clinical knowledge and ability to make good differential diagnoses. Eventually, we will have sufficient experience to permit medico-actuarial statistical studies on the value of these special tests. In the meantime, a high standard of clinical medicine in the home office and in the field should assure us of a satisfactory mortality.

Twenty-five years ago, it was considered a radical underwriting step to call for routine blood pressure observations. A few years ago, it was considered an equally drastic step to routinely require an electrocardiogram and X-ray when a large line of insurance was involved. It will be interesting to see how long it will take to modify our present mandatory rules, so that we may take into account clinical factors which we know should not be ignored. We know that the incidence of heart disease rises rapidly with advancing age and, furthermore, that serious heart damage may exist and yet may not be demonstrable on routine physical examination. Consequently, the age factor should not be ignored in calling for special heart studies. If our present rule is the

correct one for making the request for an electrocardiogram and X-ray mandatory at age thirty, it would seem desirable to revise the rule to make these requirements mandatory for smaller amounts of insurance at the older ages. If it is advisable to have an electrocardiogram and X-ray on an applicant, age thirty, applying for $100,000, which together with existing insurance brings the total line in excess of $300,000, it seems evident that we should have this evidence for smaller amounts of insurance at age sixty.

I heartily concur with Dr. Thornton's enthusiastic endorsement of a so-called chief and alternate system of appointing and controlling examiners. Adherence to this plan will reduce the number and raise the standard of our field examiners. The quality of our examiners depends entirely on the standards we set for their selection and supervision in the home office. An elaborate home office underwriting manual, or the most careful application of the numerical system of rating risks will not avail us very much if we are obliged to take action on incomplete or unreliable information from incompetent examiners.

Probably every company has some general rule for obtaining a statement from the applicant's attending physician regarding a significant personal history. Dr. Thornton's experience with reference to applicants who give a history of so-called periodic examination parallels our own. While we realize the value of a thorough examination, we know that this is a branch of preventative medicine which has not yet been widely accepted by the public. Unfortunately, relatively few healthy individuals have acquired the habit of having a routine physical examination. For underwriting purposes, we feel that the average applicant for life insurance has had a check-up examination, or a so-called periodic examination because he experienced symptoms of disturbed function or was anxious about his physical condition. A guess as to the significance of a history of periodic examination on an application for insurance may be costly.

Probably every company has some general rule for obtaining a statement from the applicant's attending physician regarding a periodic check-up or a significant personal history. Statements

covering past histories of apparently trivial illnesses may actually reveal important information, indicating that we are dealing with an uninsurable risk. Dr. Thornton tells us that in his office, it is routine practice to request a statement from every physician who has treated an applicant during the five years immediately preceding the date of application. Furthermore, this routine is carried out regardless of the apparent significance of the alleged illness or injury. I doubt if many of us have adopted as strict a rule and I, therefore, feel that it would be valuable to have Dr. Thornton enlarge upon this question of obtaining information from the family doctor, specialist, or clinic. It would be interesting to know what experience he has had in following this method and, particularly, if he is convinced that it is necessary to go back as far as five years. We would like to know who obtains permission from the applicant to consult his physician and whether the correspondence with the family doctor is carried on direct from the home office or by someone in the field office. By whom and for what amount is the attending physician reimbursed for the information he submits.

Dr. Thornton concludes his paper with two recommendations. He believes that further action along these lines would strengthen relations with our examiners and the medical profession in general. I hope that this Association will give consideration to both of the suggestions. In the meantime, however, there is an immediate profitable field for the furtherance of medical relations. We can make a more searching investigation before we appoint an examiner, we can exercise a better control and accomplish considerably more in the education of our present examiners. I do not believe that it is an impossible task for the medical director of even a good-sized company to personally know his chief examiners. I further believe that it pays to write an occasional personal letter to an alternate examiner, or even an applicant's family doctor, giving him a brief outline of our accumulated statistical experience to show the effect of departures from average physical condition on mortality. It is helpful to have him appreciate the insurance viewpoint, because he can oftentimes render a real service to the company by satisfying the

applicant or the local agent that our action is reasonable and fair. Personal contact and, short of this, personal letters, giving the field examiner the insurance viewpoint as opposed to the strictly clinical point of view, will make him a better representative of insurance medicine in his territory.

DR. WELLS—Dr. Thornton, will you kindly close the discussion of your paper?

DR. THORNTON—The paper was more or less in the nature of a challenge, an appeal for help. I want to take this opportunity of thanking everyone who discussed it.

In closing, I will limit my remarks to an endeavor to answer some of the questions that have been asked.

I believe it was Dr. Simmons who referred to the information obtained from the family physician and our method of obtaining it. We have a regular printed form for this purpose. To it is attached a duly filled out, but unsigned, check which stipulates that upon the return of the information to us the check will be signed, detached and returned to the doctor. Prior to our paying for this information we encountered considerable difficulty. After we began paying for the information we obtained it quite freely. We have two or three different forms which we use in obtaining this information and the proper one is sent out routinely. We have been doing this for a great many years, all of fifteen years. We know from our experience that it has paid us tremendous returns. The fee varies from two dollars to five dollars. I think in most clinics it is five dollars. We have found the reports from such clinics to be very valuable.

Dr. Simmons also raised the question of our attitude toward the doctor who is more or less indifferent to the work and who replies in a stereotyped manner to the questions on the examination and the medical blanks. Fortuntely, we seldom encounter that kind of an examiner, except in the small community. If he happens to be the outstanding medical man in that community or the only one available for our work, we begin by correspondence to

cultivate him. If I am in or near that territory I go around and see him. He is placed on the list of examiners that are approved, but questioned, and every case is scrutinized very carefully.

Dr. Cragin beautifully expressed my sentiments when he stated that this and other similar organizations have had ample papers upon the subject of examiners and medical relationship. I felt that way in the beginning of this paper, because I have been talking upon this subject for several years.

I do not insist that we adopt the particular methods advocated in the paper, though they do seem to me to be most obvious and quite practical. The important thing is that we move in some practical manner, in a real effort to eliminate the evils and dissatisfactions that are mutually intolerable both to the medical profession and to insurance.

# A STUDY OF TABLES OF AVERAGE WEIGHTS FOR HEIGHTS

## Using the Davenport Index of Build as a Guide

By Dr. Charles Patton Clark, Medical Director
*Mutual Benefit Life Insurance Company*

### Using the Index of Build, $\frac{w}{h^2}$, as a Guide

In a previous study, we demonstrated that the circumferences of chest and abdomen vary according to the pounds per foot of height, and in the discussion of this study, we used the term, "Height-weight Index" to denote the weight divided by the height.

Dr. Charles B. Davenport, of the Carnegie Institution of Washington, published, in 1920, a paper entitled, "The Best Index of Build". After comparing the indices $\frac{w}{h}$, $\frac{w}{h^2}$, $\frac{w}{h^{2\frac{1}{2}}}$, and $\frac{w}{h^3}$, he came to the conclusion that the best index of build is the weight divided by the square of the height. He concluded his paper with the following remarks:

"The best index of build is the weight divided by the square of the height. The theoretical justification for this lies in the fact that since men do not vary in volume by the first power of height like cylinders of the same diameter, nor like spheres by the cubes of height, but in a manner intermediate between the two, we may expect to find the appropriate divisor for the index of the build not the first power or the third power, but some intermediate power, and apparently the second power of height shows its superiority to either of the others and even to the $2\frac{1}{2}$ power. It is on this account that the best single index of build is secured by dividing weight by the square of stature."

In our further discussion, we will frequently use the term, "Davenport Index" in lieu of "index $\frac{w}{h^2}$".

In a study of the table of average weights for heights 5′0″ to 6′5″ inclusive, and for ages 15 to 55 years, developed by the

Medico-Actuarial Committee, we observed that build for various heights at a given age follows closely the index, $\frac{w}{h^2}$. It appeared worthwhile, therefore, to make a study of the material which we have, bearing on build, with special reference to the value of this index in the study and construction of tables of average weight.

In order to test three of the indices mentioned by Davenport, we took the average weight for each height of a group of 23,084 males (ungraded medico-actuarial material) with ages 35 to 37 years, inclusive, and then secured the height-weight index for each height. The following table gives the result of this study.

TABLE I.

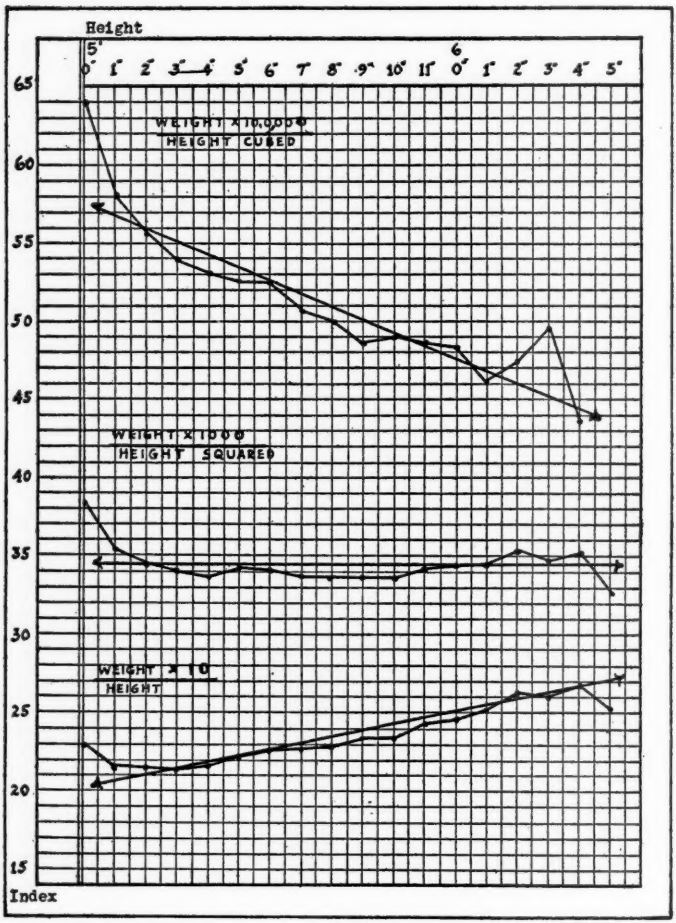
(Based on Medico-Actuarial Material
23,084 males, 35—37 years of age)

| Height (Inches) | Average Weight (Pounds) | $\frac{w \times 10}{h}$ | $\frac{w \times 1000}{h^2}$ | $\frac{w \times 100{,}000}{h^3}$ |
|---|---|---|---|---|
| 60 | 138 | 23.0 | 38.3 | 63.9 |
| 61 | 132 | 21.6 | 35.5 | 58.1 |
| 62 | 133 | 21.4 | 34.6 | 55.8 |
| 63 | 135 | 21.4 | 34.0 | 53.9 |
| 64 | 139 | 21.7 | 33.9 | 53.0 |
| 65 | 144 | 22.1 | 34.1 | 52.4 |
| 66 | 148 | 22.4 | 34.0 | 51.5 |
| 67 | 151 | 22.6 | 33.7 | 51.2 |
| 68 | 156 | 22.9 | 33.7 | 49.6 |
| 69 | 161 | 23.3 | 33.8 | 49.0 |
| 70 | 164 | 23.4 | 33.5 | 47.8 |
| 71 | 172 | 24.2 | 34.1 | 48.0 |
| 72 | 178 | 24.7 | 34.3 | 47.7 |
| 73 | 184 | 25.2 | 34.4 | 47.2 |
| 74 | 193 | 26.1 | 35.2 | 45.1 |
| 75 | 195 | 26.0 | 34.6 | 46.2 |
| 76 | 203 | 26.7 | 35.1 | 48.4 |
| 77 | 194 | 25.1 | 32.7 | 42.5 |

The following graph points to the superiority of the Index $\frac{w}{h^2}$ if we are seeking an index which is identical for all heights and respective average weights at a given age.

Graphs Obtained by Use of Three Different Indices

CHART I



The chief objection to the Davenport index lies in the fact that it is considered to be contrary to mathematical laws. Two solids are not proportionate in weight or volume to the square of any one dimension.* It is necessary to make such test of proportion by comparing the products of three dimensions: e.g., length, height, and width, or in the case of cylinders the product of height and two radii.

Since the Davenport index appears to be a satisfactory index of build, it seems probable that if we compare the human body to a cylinder, then for average weights for various heights at a given age, the various heights must bear a constant ratio to the square of the respective radii for a given cross section.

Let us test this theory with the group of 23,084 males (ages 35-37 years, inclusive) previously studied. In Table II, Column 2, are given the average ungraded weights for each height. In column 3, are given the corresponding circumferences for chest at expiration, for each height and weight, taken from the author's previously published table of circumferences. In Column 4 are given the corresponding radii assuming the cross section of the

TABLE II.

| Height | Mean Weight | Mean Circumference (Chest at Expiration from Clark Table) | Theoretical Radius | $r^3$ | $\frac{h}{r^2}$ | $\frac{w \times 10}{r^4}$ |
|---|---|---|---|---|---|---|
| 60" | 138 | 33.9 | 5.40 | 29.16 | 2.06 | 1.62 |
| 61" | 132 | 32.9 | 5.24 | 27.46 | 2.22 | 1.75 |
| 62" | 133 | 32.7 | 5.24 | 27.46 | 2.27 | 1.76 |
| 63" | 135 | 32.8 | 5.22 | 27.25 | 2.31 | 1.82 |
| 64" | 139 | 32.9 | 5.24 | 27.46 | 2.33 | 1.84 |
| 65" | 144 | 33.3 | 5.30 | 28.09 | 2.31 | 1.82 |
| 66" | 148 | 33.5 | 5.33 | 28.41 | 2.32 | 1.83 |
| 67" | 151 | 33.6 | 5.35 | 28.62 | 2.34 | 1.84 |
| 68" | 156 | 33.9 | 5.40 | 29.16 | 2.33 | 1.84 |
| 69" | 161 | 34.1 | 5.43 | 29.48 | 2.34 | 1.85 |
| 70" | 164 | 34.3 | 5.46 | 29.81 | 2.34 | 1.84 |
| 71" | 172 | 34.8 | 5.54 | 30.69 | 2.31 | 1.83 |
| 72" | 178 | 35.2 | 5.60 | 31.36 | 2.30 | 1.81 |
| 73" | 184 | 35.5 | 5.65 | 31.92 | 2.29 | 1.81 |
| 74" | 193 | 36.2 | 5.76 | 33.18 | 2.23 | 1.75 |
| 75" | 195 | 36.1 | 5.74 | 32.95 | 2.28 | 1.79 |
| 76" | 203 | 36.6 | 5.82 | 33.87 | 2.24 | 1.77 |
| | | | | Averages | 2.28 | 1.80 |

*An exception to this is found in the particular case where one dimension remains constant and the second and third are equal.

chest to be circular. In Column 6 are given the approximate ratios of height to the square of the respective radius. These values are remarkably similar when we consider that the weights as given are the ungraded averages.

It is apparent, therefore, that the human figure may be compared to a cylinder and that as we proceed from short to tall men, the increase in the area of a cross section increases exactly proportionately with the height. Also the volumes or weights should be proportionate to the product of height and the area of a cross section. But since the area of a cross section increases exactly in proportion to the increase in height, we may use the index $\frac{w}{h^3}$ instead of an index $\frac{w}{hr^2}$. One mathematician has criticized this explanation stating that if we can substitute h for $r^3$ arriving at the index $\frac{w}{h^3}$, we should then be able to substitute $r^3$ for h and arrive at an index $\frac{w}{r^4}$, which index he assumed to be inapplicable. To demonstrate that such an index would give similarly equal values at a given age, we have tabulated in Column 7, the values for $\frac{w}{r^4}$ and we find that these values are also remarkably similar.

In order to study further the Davenport Index as a guide to build, we have incorporated in one table the Davenport Indices of five different groups. The source of the material in these groups is as follows:

Group A—Based on study of 221,727 insured males (ages 15 and over) from material collected by 43 insurance companies operating in the United States and Canada. (Original ungraded data.)

B—Study of 134,343 insured females (ages 15 and over) material collected by same group of insurance companies mentioned in group A. (Original ungraded data.)

C—Calculated from study of 81,558 white and colored troops serving in the United States Army during the World War. Measurements taken at demobilization.

D—Calculated from material collected by Gould (Civil War Troops).

E—Study of 9,392 insured males (ages 14-70—Mutual Benefit Life Ins. Co.).

From this material, which represents a study of approximately one-half million adults, the following table of indices has been developed.

Davenport Indices for Each Height 5′ 0″—6′ 3″

TABLE III.

| | A Medico-Act., Men | B Medico-Act., Women | C World War Veterans | D Civil War Veterans | E Mut. Ben. Males | Average of all groups | Deviation from Average Index |
|---|---|---|---|---|---|---|---|
| 5′ 0″ | 37.28 | 33.98 | 34.17 | 31.05 | 30.56 | 33.41 | +1.14 |
| 1 | 34.57 | 33.32 | 33.77 | 31.60 | 30.26 | 32.70 | +0.43 |
| 2 | 34.21 | 32.87 | 33.06 | 31.42 | 32.13 | 32.74 | +0.47 |
| 3 | 33.57 | 32.63 | 32.69 | 30.98 | 31.85 | 32.54 | +0.27 |
| 4 | 33.54 | 32.28 | 32.19 | 31.35 | 32.96 | 32.46 | +0.19 |
| 5 | 33.31 | 32.18 | 32.00 | 31.27 | 32.95 | 32.34 | +0.07 |
| 6 | 33.33 | 32.16 | 31.97 | 31.24 | 32.80 | 32.30 | +0.03 |
| 7 | 33.14 | 32.02 | 31.79 | 31.36 | 32.83 | 32.23 | −0.04 |
| 8 | 33.16 | 32.01 | 31.47 | 31.34 | 32.85 | 32.17 | −0.10 |
| 9 | 33.10 | 31.93 | 31.38 | 31.30 | 32.98 | 32.14 | −0.13 |
| 10 | 33.05 | 31.74 | 31.29 | 31.26 | 32.67 | 32.00 | −0.27 |
| 11 | 33.15 | 31.53 | 31.13 | 31.38 | 32.82 | 32.00 | −0.27 |
| 6′ 0″ | 33.55 | 31.22 | 30.83 | 31.34 | 32.98 | 31.98 | −0.29 |
| 1 | 33.71 | 32.97 | 30.78 | 31.22 | 32.95 | 32.32 | +0.05 |
| 2 | 34.00 | | 29.87 | 30.86 | 32.83 | 31.89 | −0.38 |
| 3 | 32.23 | | 29.87 | 30.29 | 32.16 | 31.14 | −1.13 |
| | | | | | Average | 32.27 | |

(See Graphs—pages 22-25)

It is obvious from the above study that the deviation of the indices at the extreme heights from the average is very slight; that for short individuals the deviation is slightly plus, but for tall individuals it is slightly minus.

We have sought an explanation for these slight deviations from the average index, which corresponds approximately to the index for 5′7″. The influence of age is not a factor in groups A and B.

In group E the average age is approximately the same for all heights except for heights 5′ 0″ to 5′ 2″, for which the age is less than for other heights. Correction for age here would give indices approximately the same as for all heights in that group.

We believe that the factor of nationality is to a large extent responsible for the deviations noted, for we know that the short races tend to be of the stocky type and the tall races are of the more slender type. We have available the average height and the average Davenport index for each of eight representative European nations. These measurements were taken at demobilization following the World War. The following table is constructed from the data given in the study of anthropology by the medical department of the United States Army.

| | Race | Average Height | Average Weight | Davenport Index | Average Index | Average Height |
|---|---|---|---|---|---|---|
| Tall Races | Scotch | 67.93 in. | 144.93 | 31.41 | 31.68 | 67.68 |
| | English | 67.75 in. | 144.98 | 31.59 | | |
| | German | 67.73 in. | 148.20 | 32.31 | | |
| | Irish | 67.46 in. | 142.96 | 31.41 | | |
| Short Races | Polish | 66.70 in. | 145.62 | 32.73 | 32.39 | 65.95 |
| | French | 66.37 in. | 142.16 | 32.28 | | |
| | Hebrews | 65.71 in. | 137.85 | 31.93 | | |
| | Italians | 65.03 in. | 137.99 | 32.63 | | |

From the above table, it is evident that the taller European races tend to have a slightly lower Davenport index than is found in the shorter races. It seems probable, therefore, that in a non-homogeneous group such as that of the World War series, a large percentage of men included in height 5′ 5″ and less were derived from the short European races with higher height-weight indices, whereas for height 5′ 11″ and over, the tall races with lower height-weight indices predominated. It might be noted also that in the Civil War series there was very little deviation in indices at the extremes of height. This is probably due to a greater homogeneity of the northern population at that time. It was many years later that the influx of Southern Europeans began. The

following discussion of these two groups is taken from the United States Army publication previously mentioned, pages 255 and 256.

> "Comparing the two series, with due allowance for the latter including about 6 per cent. negro troops, it appears that, on the average, men of 70 inches and under in stature are heavier among the demobilized soldiers of 1919, but men over 70 inches are lighter than they were in 1866. This indicates that there has been a change in our population through the addition of short stout men and tall lank men. There has indeed clearly been an addition to our population of short thick-set persons from southeastern Europe and from French Canada, and our tall population (including the mountain whites and many of the tall men of the Southern States) has become lanker, through the inclusion of a larger percentage of this lank type in the 1917 data than in the 1866 data.
>
> "It is very difficult to answer the question whether the physique of our young men has changed in the last 50 years. Indeed, the question thus unqualified has little meaning. Had the racial constitution of the population remained constant, that is, had there been no heavy immigration, then the question would have more meaning; but in view of the tremendous immigration, amounting in some years to nearly a million persons, the physical changes of the racial constitution of our stock have been so great as to mask entirely any slight alteration that may have occurred in the physique of the stock of 50 years ago either through improvement or deterioration of environmental or economic conditions."

It is of interest to note that the recent study of 285,000 standard risks at age 20 years and over, accepted by 39 life insurance companies during the years 1909 to 1927, showed a slight increase in average weight for short men, and a slight decrease for tall when compared with risks selected between the years 1885 to 1908. This change is, no doubt, largely due to the great increase of insured lives derived from the southern European races, and also artificial selection among tall men.

As an illustration of the effect of homogeneity in respect to Race on tables of average weights, I am greatly indebted to Dr. O. F. Mendonça, of the "Sul America" Companhia Nactional de Seguro de Vida, Rio de Janeiro, for the privilege of quoting the experiences of his company in the recent construction of indi-

vidual tables of average weights for the inhabitants of each of the following countries: Brazil, Argentine Republic, Peru, France, Spain and Portugal. Desiring a method for the construction of smoothed tables from the rough data accumulated, Dr. Mendonça applied to the secretary of the Actuarial Society of America, Mr. John S. Thompson, for suggestions. This request was transferred to the writer, who sent to Dr. Mendonça a copy of the preliminary study made on the value of the Davenport Index in the construction of tables of average weight.

Dr. Mendonça demonstrated definitely the accuracy of the Davenport Index as a guide in the construction of such tables for homogeneous groups and has now completed tables for both males and females for the countries above mentioned. His tables have been reviewed by Maurice Gauthier, Chief Actuary for the "Sul America", who has personally endorsed them, and it is also of interest to note that these tables have been formally adopted by the "Sul America".

Dr. Mendonça also kindly called to my attention a recent study by Dr. I. Romanelli, of 100,116 Italian risks (See L'Assistenza Sanitania—Rome—15 Aprile, 1933—XI). This group, insofar as race and environment are concerned, appears to be much more homogeneous than the insured group of the American insurance companies. Table A gives the rough data obtained by Dr. Romanelli (heights and weights in metric system).

TABLE A.

Average weights in Kilograms for various height groups (centimeters) and for six age groups. (Romanelli) (ungraded)

| AGES | HEIGHTS 151–155 cms. | 156–160 cms. | 161–165 cms. | 166–170 cms. | 171–175 cms. | 176–180 cms. | 181–185 cms. | 186–190 cms. |
|---|---|---|---|---|---|---|---|---|
| 21–25 yrs. | 54.96 | 59.12 | 63.14 | 66.93 | 71.39 | 74.67 | 80.23 | 83.02 |
| 26–30 " | 56.71 | 60.51 | 64.44 | 68.61 | 73.06 | 76.78 | 81.61 | 86.24 |
| 31–35 " | 58.32 | 61.91 | 65.76 | 70.32 | 74.92 | 79.15 | 83.62 | 87.05 |
| 36–40 " | 59.62 | 62.93 | 67.62 | 70.01 | 77.37 | 81.32 | 85.20 | 91.01 |
| 41–45 " | 61.51 | 64.24 | 68.70 | 73.36 | 79.49 | 82.84 | 88.01 | 91.93 |
| 46–50 " | 60.68 | 65.41 | 69.82 | 74.48 | 79.31 | 83.64 | 87.95 | 94.64 |

Table B gives the Davenport Index for each age group, and each height group, using the central height. The weight is multi-

plied by 10,000. For example, for ages 21-25 and 151-155 cms. height, the Davenport Index $= \frac{54.96 \times 10{,}000}{(153)^2} = 23.47.$

In the last column is given for each age group, the average of the indices for that group.

TABLE B

Values for Davenport Indices Based on Table A

| AGES | HEIGHTS 151–155 cms. | 156–160 cms. | 161–165 cms. | 166–170 cms. | 171–175 cms. | 176–180 cms. | 181–185 cms. | 186–190 cms. | Average |
|---|---|---|---|---|---|---|---|---|---|
| 21–25 yrs. | 23.47 | 23.68 | 23.77 | 23.71 | 23.85 | 23.57 | 23.82 | 23.49 | 23.670 |
| 26–30 " | 24.23 | 24.24 | 24.25 | 24.31 | 24.41 | 24.23 | 24.37 | 24.40 | 24.305 |
| 31–35 " | 24.91 | 24.80 | 24.75 | 24.92 | 25.03 | 24.98 | 24.97 | 24.63 | 24.874 |
| 36–40 " | 25.47 | 25.32 | 25.45 | 24.80 | 25.85 | 25.66 | 25.44 | 25.75 | 25.467 |
| 41–45 " | 26.27 | 25.74 | 25.86 | 25.99 | 26.51 | 26.15 | 26.28 | 26.01 | 26.101 |
| 46–50 " | 25.92 | 26.20 | 26.28 | 26.39 | 26.50 | 26.39 | 26.26 | 26.78 | 26.340 |

With the aid of the indices in the last column, we may smooth out the weight table in the following manner. The average index for group 21-25 years is 23.670. The graded weight for 153 cms. height is therefore $\frac{(153)^2 \times 23.670}{10{,}000} = 55.41$ kilograms. Table C represents the graded table developed from the rough data recorded in Table A. We have also included the theoretical weights for heights of 148 cms. and 193 cms., for which no data was given in Dr. Romanelli's original table.

TABLE C.

Graduated Weight Table

(including estimated weight value for 148 and 193 cms. respectively)

| AGES | HEIGHTS 148 cms. | 153 cms. | 158 cms. | 163 cms. | 168 cms. | 173 cms. | 178 cms. | 183 cms. | 188 cms. | 193 cms. |
|---|---|---|---|---|---|---|---|---|---|---|
| 21–25 | 51.85 | 55.41 | 59.09 | 62.89 | 66.81 | 70.84 | 75.00 | 79.27 | 83.66 | 88.17 |
| 26–30 | 53.23 | 56.90 | 60.01 | 64.58 | 68.60 | 72.74 | 77.01 | 81.40 | 85.90 | 90.54 |
| 31–35 | 54.48 | 58.23 | 62.10 | 66.09 | 70.20 | 74.45 | 78.81 | 83.30 | 87.91 | 92.67 |
| 36–40 | 55.78 | 59.62 | 63.57 | 67.67 | 71.87 | 75.22 | 80.69 | 85.29 | 88.01 | 94.86 |
| 41–45 | 57.16 | 61.10 | 65.16 | 69.35 | 73.66 | 78.11 | 82.70 | 87.41 | 92.25 | 97.22 |
| 46–50 | 57.69 | 61.66 | 65.75 | 69.99 | 74.34 | 78.83 | 83.46 | 88.21 | 93.10 | 98.12 |

A second method for developing a graded table is to use the following procedure:—

Obtain for each age, or age group, from the ungraded material—

(a) The average weight.
(b) The average height.
(c) The index of build for the age, or age group, by dividing the average weight multiplied by 1,000 by the square of the average height (in inches).
(d) The theoretical weight for each height 5′ 0″ to 6′ 6″ by multiplying the index of build for age, or age group, by the square of 60 inches, 61 inches, etc., and dividing by 1,000.

Such a table we have developed, using the material gathered by the Medico-Actuarial Committee and previously mentioned as Group A of Table II. (It should be stated that this method should not be used in formulating tables of weight for infancy and childhood and preferably not until age 18, at which time growth in stature is practically complete.) The following table gives a synopsis of the material used in developing the theoretical table of heights and weights.

TABLE III

Developed from Ungraded Material of Medico-Actuarial Investigation

Males

| Age | Mean Height | Mean Weight | $\frac{W \times 1000}{H^2}$ |
|---|---|---|---|
| 15 | 64.346 | 115.794 | 27.96 |
| 16 | 65.897 | 126.112 | 29.04 |
| 17 | 67.129 | 134.099 | 29.76 |
| 18 | 67.707 | 139.737 | 30.48 |
| 19 | 68.130 | 143.137 | 30.83 |
| 20–21–22 | 68.381 | 146.840 | 31.41 |
| 23–24–25 | 68.486 | 150.020 | 31.98 |
| 26–27–28 | 68.544 | 152.662 | 32.49 |
| 29–30–31 | 68.529 | 155.094 | 33.02 |
| 32–33–34 | 68.555 | 157.532 | 33.52 |
| 35–36–37 | 68.592 | 159.575 | 33.92 |
| 38–39–40 | 68.502 | 161.285 | 34.37 |
| 41–42–43 | 68.429 | 162.456 | 34.69 |
| 44–45–46 | 68.463 | 163.192 | 34.82 |
| 47–48–49 | 68.504 | 164.985 | 35.16 |
| 50–54 | 68.492 | 165.534 | 35.28 |
| 55–59 | 68.371 | 165.292 | 35.36 |
| 60–65 | 68.393 | 165.108 | 35.29 |
| 66 and Over | 68.522 | 167.304 | 35.63 |

With the above indices, we then proceeded to develop for each age, from 15 to 49 years and two older groups, the average weight for height 5′ 0″ to 6′ 6″ by multiplying the index for each age by the square of each height and dividing by 1,000. The following table was thus prepared:

TABLE IV

HEIGHT-WEIGHT TABLE FOR MEN

(Based on Original M. A. Material and Davenport's Index of Build)

| | 5 Feet | | | | | | | | | | | 6 Feet | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 15 | 101 | 104 | 107 | 111 | 114 | 118 | 122 | 125 | 129 | 133 | 137 | 141 | 145 | 149 | 153 | 157 | 162 | 166 | 170 |
| 16 | 105 | 108 | 111 | 115 | 119 | 123 | 127 | 130 | 134 | 138 | 142 | 146 | 150 | 155 | 159 | 163 | 168 | 172 | 177 |
| 17 | 108 | 111 | 114 | 118 | 122 | 126 | 130 | 134 | 138 | 142 | 146 | 150 | 154 | 159 | 163 | 167 | 172 | 176 | 181 |
| 18 | 110 | 114 | 117 | 121 | 125 | 129 | 133 | 137 | 141 | 145 | 149 | 153 | 158 | 163 | 167 | 171 | 176 | 181 | 186 |
| 19 | 111 | 115 | 118 | 122 | 126 | 130 | 134 | 138 | 143 | 147 | 151 | 155 | 160 | 165 | 169 | 173 | 177 | 183 | 188 |
| 20 | 112 | 116 | 119 | 123 | 127 | 131 | 135 | 139 | 144 | 148 | 153 | 157 | 162 | 167 | 171 | 175 | 180 | 185 | 190 |
| 21 | 113 | 117 | 120 | 124 | 128 | 132 | 136 | 140 | 145 | 149 | 154 | 158 | 163 | 168 | 172 | 177 | 181 | 186 | 191 |
| 22 | 114 | 118 | 121 | 125 | 129 | 133 | 137 | 141 | 146 | 150 | 155 | 159 | 164 | 169 | 173 | 178 | 182 | 187 | 192 |
| 23 | 114 | 118 | 122 | 126 | 130 | 134 | 138 | 142 | 147 | 151 | 156 | 160 | 165 | 170 | 174 | 179 | 183 | 188 | 193 |
| 24 | 115 | 119 | 123 | 127 | 131 | 135 | 139 | 143 | 148 | 152 | 157 | 161 | 166 | 171 | 175 | 180 | 185 | 189 | 195 |
| 25 | 116 | 120 | 124 | 128 | 132 | 136 | 140 | 144 | 149 | 153 | 158 | 162 | 167 | 172 | 176 | 181 | 186 | 190 | 196 |
| 26 | 116 | 120 | 124 | 128 | 132 | 137 | 141 | 145 | 149 | 154 | 158 | 163 | 168 | 173 | 177 | 182 | 187 | 191 | 197 |
| 27 | 117 | 121 | 125 | 129 | 133 | 137 | 142 | 146 | 150 | 155 | 159 | 164 | 168 | 173 | 178 | 183 | 188 | 193 | 198 |
| 28 | 118 | 121 | 126 | 129 | 134 | 138 | 142 | 146 | 151 | 155 | 160 | 165 | 169 | 174 | 179 | 184 | 189 | 194 | 199 |
| 29 | 118 | 122 | 126 | 130 | 135 | 139 | 143 | 147 | 152 | 156 | 161 | 166 | 170 | 175 | 180 | 185 | 190 | 195 | 200 |
| 30 | 119 | 123 | 127 | 131 | 135 | 139 | 144 | 148 | 153 | 157 | 162 | 166 | 171 | 176 | 181 | 186 | 191 | 196 | 201 |
| 31 | 119 | 123 | 128 | 132 | 136 | 140 | 145 | 149 | 153 | 158 | 163 | 167 | 172 | 177 | 182 | 187 | 192 | 197 | 202 |
| 32 | 120 | 124 | 128 | 132 | 137 | 141 | 145 | 150 | 154 | 159 | 163 | 168 | 173 | 178 | 183 | 188 | 193 | 198 | 203 |
| 33 | 121 | 125 | 129 | 133 | 138 | 142 | 146 | 150 | 155 | 160 | 164 | 169 | 174 | 179 | 184 | 189 | 194 | 199 | 204 |
| 34 | 121 | 125 | 129 | 133 | 138 | 142 | 147 | 151 | 156 | 160 | 165 | 170 | 175 | 180 | 184 | 189 | 194 | 199 | 205 |
| 35 | 122 | 126 | 130 | 134 | 138 | 143 | 147 | 152 | 156 | 161 | 166 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 206 |
| 36 | 122 | 126 | 130 | 134 | 139 | 143 | 148 | 152 | 157 | 161 | 166 | 171 | 176 | 181 | 186 | 191 | 196 | 201 | 206 |
| 37 | 122 | 127 | 131 | 135 | 140 | 144 | 148 | 153 | 158 | 162 | 167 | 172 | 177 | 182 | 187 | 192 | 197 | 202 | 207 |
| 38 | 123 | 127 | 132 | 136 | 140 | 145 | 149 | 154 | 158 | 163 | 168 | 173 | 177 | 182 | 187 | 192 | 198 | 203 | 208 |
| 39 | 124 | 128 | 132 | 136 | 141 | 145 | 150 | 154 | 159 | 164 | 168 | 173 | 178 | 183 | 188 | 193 | 198 | 204 | 209 |
| 40 | 124 | 128 | 133 | 137 | 141 | 146 | 150 | 155 | 159 | 164 | 169 | 174 | 179 | 184 | 189 | 194 | 199 | 204 | 210 |
| 41 | 125 | 129 | 133 | 137 | 142 | 146 | 151 | 155 | 160 | 165 | 169 | 174 | 179 | 185 | 189 | 195 | 200 | 205 | 210 |
| 42 | 125 | 129 | 133 | 138 | 142 | 147 | 151 | 156 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 206 | 211 |
| 43 | 125 | 129 | 133 | 138 | 142 | 147 | 151 | 156 | 160 | 165 | 170 | 175 | 180 | 185 | 190 | 195 | 200 | 206 | 211 |
| 44 | 125 | 129 | 134 | 138 | 142 | 147 | 151 | 156 | 161 | 165 | 170 | 175 | 180 | 186 | 190 | 196 | 201 | 206 | 211 |
| 45 | 125 | 130 | 134 | 138 | 143 | 147 | 152 | 156 | 161 | 166 | 171 | 176 | 180 | 186 | 191 | 196 | 201 | 206 | 212 |
| 46 | 126 | 130 | 134 | 139 | 143 | 148 | 152 | 157 | 162 | 166 | 171 | 176 | 181 | 186 | 191 | 196 | 202 | 207 | 213 |
| 47 | 126 | 130 | 135 | 139 | 144 | 148 | 153 | 157 | 162 | 167 | 172 | 177 | 182 | 187 | 192 | 197 | 202 | 208 | 213 |
| 48 | 127 | 131 | 135 | 140 | 144 | 148 | 153 | 158 | 163 | 167 | 172 | 177 | 182 | 188 | 192 | 198 | 203 | 208 | 214 |
| 49 | 127 | 131 | 135 | 140 | 144 | 149 | 153 | 158 | 163 | 168 | 172 | 177 | 182 | 188 | 193 | 198 | 203 | 209 | 214 |
| 50-54 | 127 | 131 | 136 | 140 | 145 | 149 | 154 | 158 | 163 | 168 | 173 | 178 | 183 | 188 | 193 | 198 | 204 | 209 | 215 |
| 55 and over | 127 | 132 | 136 | 140 | 145 | 149 | 154 | 159 | 163 | 168 | 173 | 178 | 183 | 189 | 194 | 199 | 204 | 209 | 215 |

By the same method, and using the original ungraded data on women, collected by the Medico-Actuarial committee, the following theoretical table for women was developed.

TABLE V

HEIGHT-WEIGHT TABLE FOR WOMEN

(Based on Original M. A. Material and Davenport's Index of Build)

| | 4 Feet | | | | 5 Feet | | | | | | | | | | | 6 Feet |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Age | 8 | 9 | 10 | 11 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 0 |
| 15 | 89 | 93 | 96 | 99 | 103 | 106 | 110 | 113 | 117 | 121 | 124 | 128 | 132 | 136 | 140 | 144 | 148 |
| 16 | 92 | 95 | 98 | 102 | 105 | 109 | 112 | 116 | 120 | 123 | 127 | 131 | 135 | 139 | 143 | 147 | 151 |
| 17 | 94 | 98 | 101 | 105 | 108 | 112 | 116 | 119 | 123 | 127 | 131 | 135 | 139 | 143 | 148 | 152 | 156 |
| 18 | 95 | 99 | 102 | 106 | 109 | 113 | 117 | 120 | 124 | 128 | 132 | 136 | 140 | 144 | 149 | 153 | 157 |
| 19 | 96 | 99 | 103 | 106 | 110 | 113 | 117 | 121 | 125 | 129 | 133 | 137 | 141 | 145 | 149 | 154 | 158 |
| 20 | 96 | 99 | 103 | 107 | 110 | 114 | 118 | 121 | 125 | 129 | 133 | 137 | 142 | 146 | 150 | 154 | 159 |
| 21 | 96 | 100 | 103 | 107 | 111 | 114 | 118 | 122 | 126 | 130 | 134 | 138 | 142 | 146 | 150 | 155 | 159 |
| 22 | 97 | 100 | 104 | 107 | 111 | 115 | 119 | 122 | 126 | 130 | 134 | 138 | 143 | 147 | 151 | 155 | 160 |
| 23 | 97 | 100 | 104 | 108 | 112 | 115 | 119 | 123 | 127 | 131 | 135 | 139 | 143 | 148 | 152 | 156 | 161 |
| 24 | 97 | 101 | 104 | 108 | 112 | 115 | 119 | 123 | 127 | 131 | 135 | 139 | 143 | 148 | 152 | 156 | 161 |
| 25 | 98 | 101 | 105 | 109 | 112 | 116 | 120 | 124 | 128 | 132 | 136 | 140 | 144 | 148 | 153 | 157 | 162 |
| 26 | 98 | 102 | 105 | 109 | 113 | 117 | 120 | 124 | 128 | 132 | 136 | 140 | 145 | 149 | 153 | 158 | 162 |
| 27 | 99 | 102 | 106 | 110 | 113 | 117 | 121 | 125 | 129 | 133 | 137 | 141 | 146 | 150 | 154 | 159 | 163 |
| 28 | 99 | 103 | 106 | 110 | 113 | 118 | 122 | 126 | 130 | 134 | 138 | 142 | 147 | 151 | 155 | 160 | 164 |
| 29 | 100 | 103 | 107 | 111 | 114 | 118 | 122 | 126 | 130 | 134 | 138 | 143 | 147 | 151 | 156 | 160 | 165 |
| 30 | 100 | 104 | 108 | 111 | 115 | 119 | 123 | 127 | 131 | 135 | 139 | 144 | 148 | 152 | 157 | 161 | 166 |
| 31 | 101 | 105 | 108 | 112 | 116 | 120 | 124 | 128 | 132 | 136 | 140 | 144 | 149 | 153 | 158 | 162 | 167 |
| 32 | 102 | 105 | 109 | 113 | 117 | 120 | 124 | 129 | 133 | 137 | 141 | 145 | 150 | 154 | 159 | 163 | 168 |
| 33 | 102 | 106 | 110 | 113 | 117 | 121 | 125 | 129 | 133 | 138 | 142 | 146 | 151 | 155 | 159 | 164 | 169 |
| 34 | 103 | 106 | 110 | 114 | 118 | 122 | 126 | 130 | 134 | 138 | 143 | 147 | 151 | 156 | 160 | 165 | 170 |
| 35 | 103 | 107 | 111 | 115 | 119 | 123 | 127 | 131 | 135 | 139 | 144 | 148 | 153 | 157 | 161 | 166 | 171 |
| 36 | 104 | 108 | 111 | 115 | 119 | 123 | 127 | 131 | 136 | 140 | 144 | 149 | 153 | 158 | 162 | 167 | 172 |
| 37 | 104 | 108 | 112 | 116 | 120 | 124 | 128 | 132 | 136 | 141 | 145 | 149 | 154 | 158 | 163 | 168 | 173 |
| 38 | 105 | 109 | 112 | 116 | 120 | 125 | 129 | 133 | 137 | 141 | 146 | 150 | 155 | 159 | 164 | 169 | 173 |
| 39 | 105 | 109 | 113 | 117 | 121 | 125 | 129 | 133 | 138 | 142 | 147 | 151 | 155 | 160 | 165 | 170 | 174 |
| 40 | 106 | 110 | 114 | 118 | 121 | 126 | 130 | 134 | 138 | 143 | 147 | 152 | 156 | 161 | 166 | 170 | 175 |
| 41 | 106 | 110 | 114 | 118 | 122 | 127 | 131 | 135 | 139 | 144 | 148 | 153 | 157 | 162 | 167 | 171 | 176 |
| 42 | 107 | 111 | 115 | 119 | 123 | 127 | 131 | 135 | 140 | 144 | 149 | 153 | 158 | 163 | 167 | 172 | 177 |
| 43 | 108 | 111 | 115 | 119 | 124 | 128 | 132 | 136 | 141 | 145 | 150 | 154 | 159 | 163 | 168 | 173 | 178 |
| 44 | 108 | 112 | 116 | 120 | 124 | 128 | 133 | 137 | 141 | 146 | 150 | 155 | 159 | 164 | 169 | 174 | 179 |
| 45 | 109 | 113 | 117 | 121 | 125 | 129 | 133 | 138 | 142 | 147 | 151 | 156 | 160 | 165 | 170 | 175 | 180 |
| 46 | 109 | 113 | 117 | 121 | 125 | 130 | 134 | 138 | 143 | 147 | 152 | 156 | 161 | 166 | 171 | 176 | 181 |
| 47 | 110 | 114 | 118 | 122 | 126 | 130 | 135 | 139 | 143 | 148 | 152 | 157 | 162 | 167 | 172 | 176 | 181 |
| 48 | 110 | 114 | 118 | 122 | 126 | 131 | 135 | 139 | 144 | 148 | 153 | 157 | 162 | 167 | 172 | 177 | 182 |
| 49 | 111 | 115 | 119 | 123 | 127 | 131 | 136 | 140 | 144 | 149 | 154 | 158 | 163 | 168 | 173 | 178 | 183 |
| 50 | 112 | 116 | 120 | 124 | 128 | 132 | 137 | 141 | 146 | 150 | 155 | 160 | 164 | 170 | 175 | 180 | 185 |
| 51 | 112 | 116 | 120 | 124 | 128 | 132 | 137 | 141 | 146 | 150 | 155 | 160 | 164 | 170 | 175 | 180 | 185 |
| 52 | 112 | 116 | 120 | 124 | 128 | 132 | 137 | 141 | 146 | 150 | 155 | 160 | 164 | 170 | 175 | 180 | 185 |
| 53 | 112 | 116 | 120 | 124 | 128 | 132 | 137 | 141 | 146 | 150 | 155 | 160 | 164 | 170 | 175 | 180 | 185 |
| 54 | 112 | 116 | 120 | 124 | 128 | 132 | 137 | 141 | 146 | 150 | 155 | 160 | 164 | 170 | 175 | 180 | 185 |
| 55 and over | 112 | 116 | 120 | 124 | 128 | 132 | 137 | 141 | 146 | 150 | 155 | 160 | 164 | 170 | 175 | 180 | 185 |

It may be stated that the most important factors bearing on the problem of average weight are height, age, sex and race. It is important that we remember, also, that severe preliminary selection with respect to underweight or overweight, subnormal or excessive height, personal or family record, are factors which commonly enter into the selection of insurance risks and which may materially affect the table.

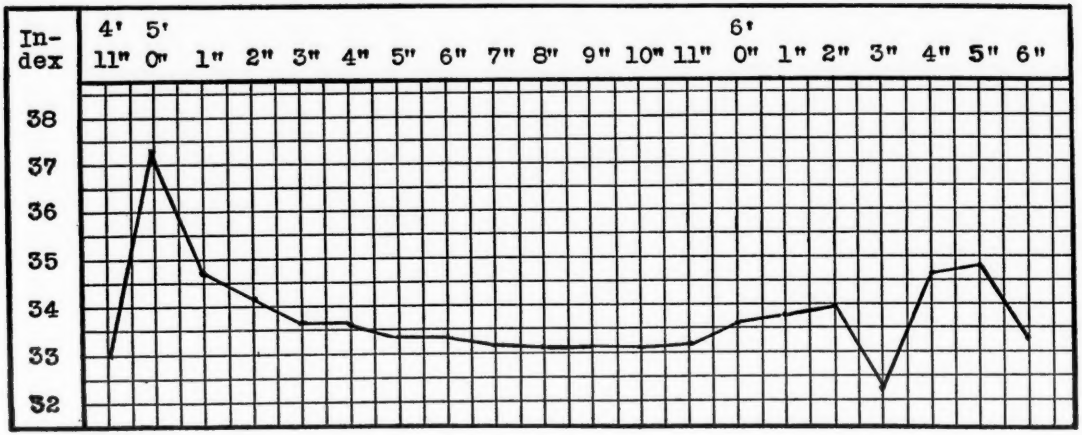
It appears probable that the Davenport index may be an aid in eliminating some of these factors, and may also be of great practical value in developing tables of weight for homogeneous groups from records on relatively small groups of individuals; it is certainly of value in analyzing tables already developed by arithmetical methods, for by its use one is able to ascertain deviations at the extremes of height due to effects of selection, race, dearth of material and other influences.

The study, furthermore, confirms the previous statements as to the value of the index $\frac{w}{h^2}$ as a test of build made by Quetelet, Gould, and Davenport.

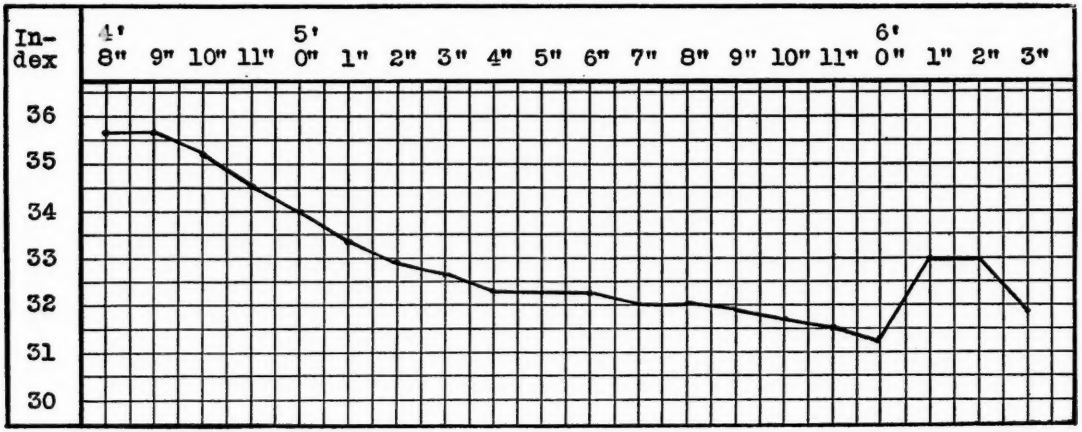
The effect on the index of excessively short legs in short, stocky individuals, or of excessively long legs in tall people may have some influence in giving a higher index in the short, and a lower index in the tall group, and may be particularly important in causing differences found in the relative height of the indices of different national groups. Apparently, however, in a homogeneous racial group, the effect of leg length aside from its general bearing on total height, even at the extremes of height, appears to be slight. A study similar to the one here presented and based on weight and sitting height, might prove to be of interest.

We are including from a large collection a few graphs which illustrate the effect of homogeneity or its absence with respect to race and environment on the indices for different heights.

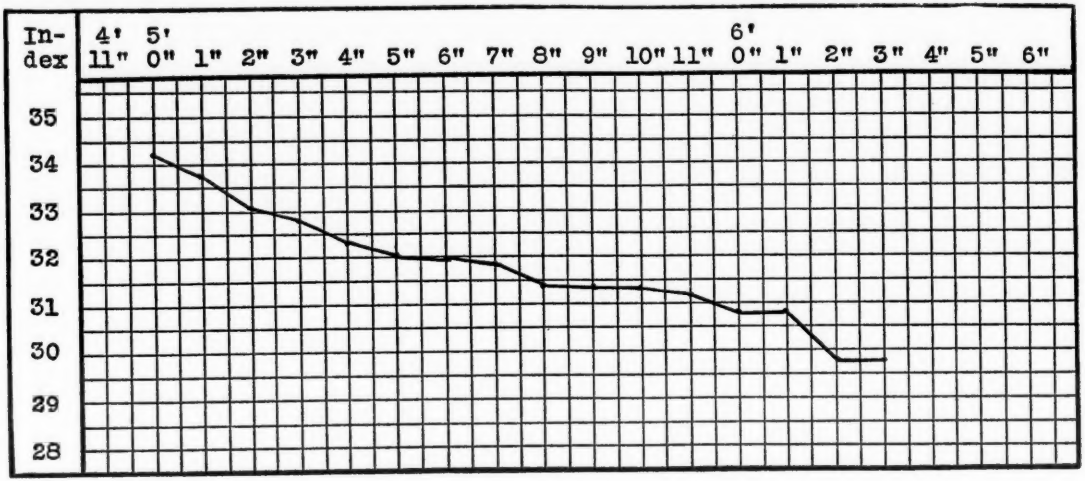
A
Medico-Actuarial Investigation
Approximately 222,000 Risks (ages 14-70)
(Ungraded)

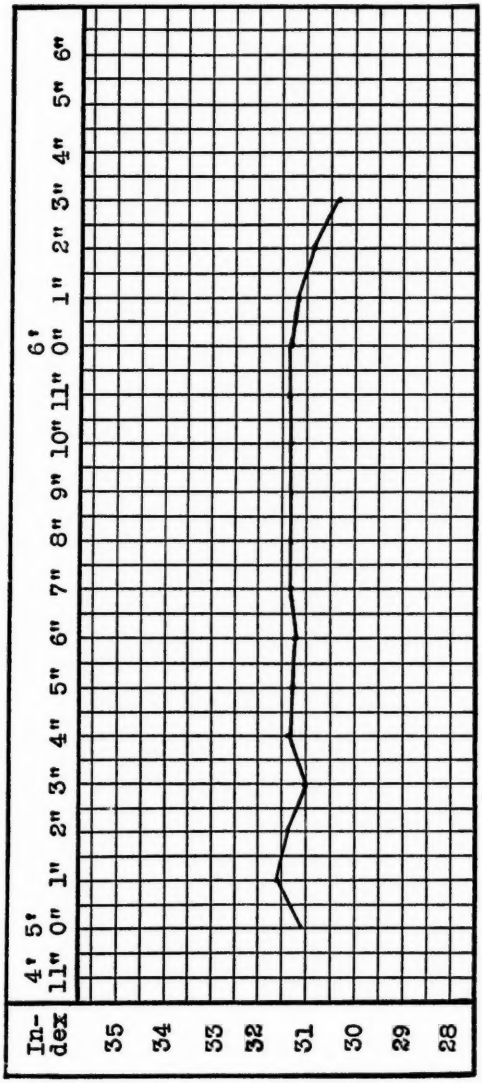


B
FEMALES
Medico-Actuarial Investigation
Approximately 135,000 Risks (ages 14-70)
(Ungraded)



C
MALE
World War Veterans at Demobilization
Approximately 80,000 White and Colored Troops



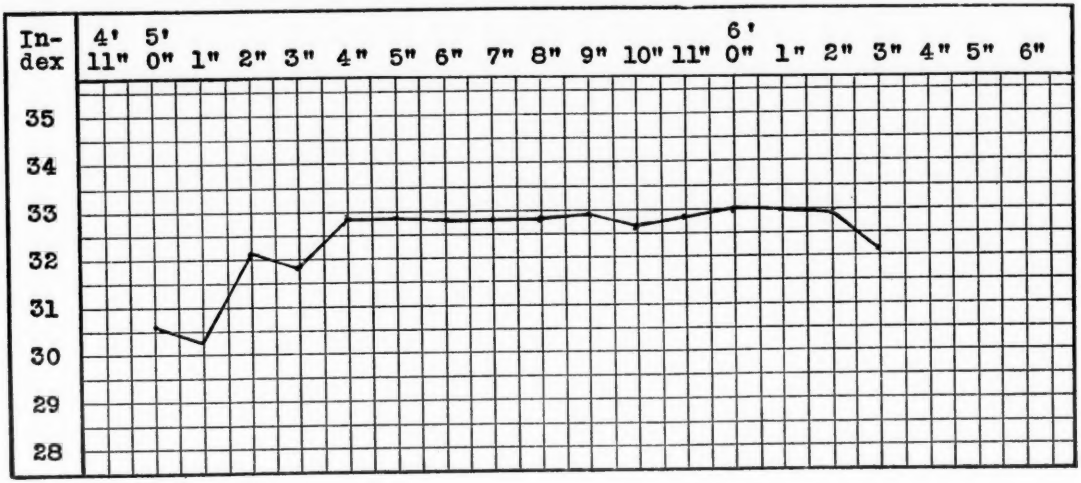



D
Civil War Troops
(Gould)

E

MALES

Based on Study of Approximately
10,000 Risks Insured by the Mutual Benefit Life Ins. Co. (Ages 14-70)

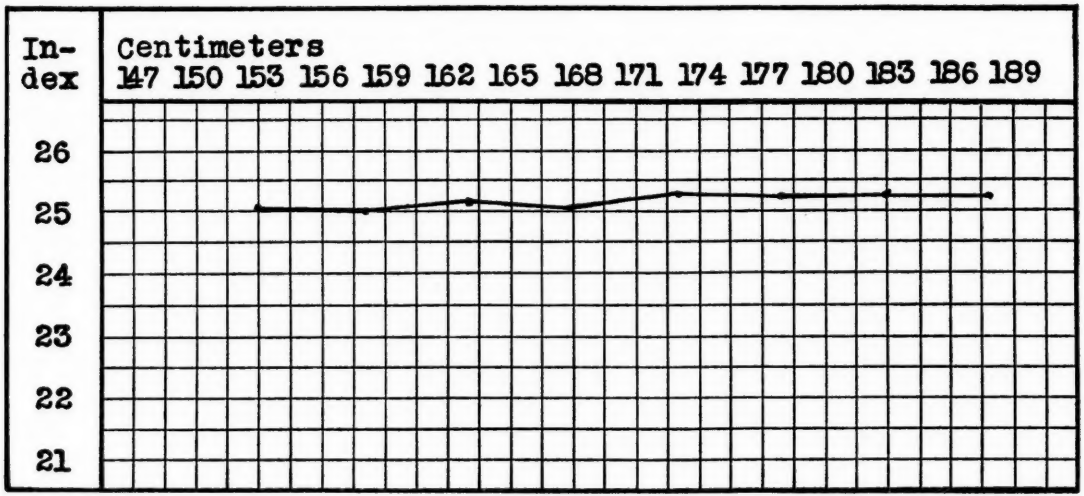


F

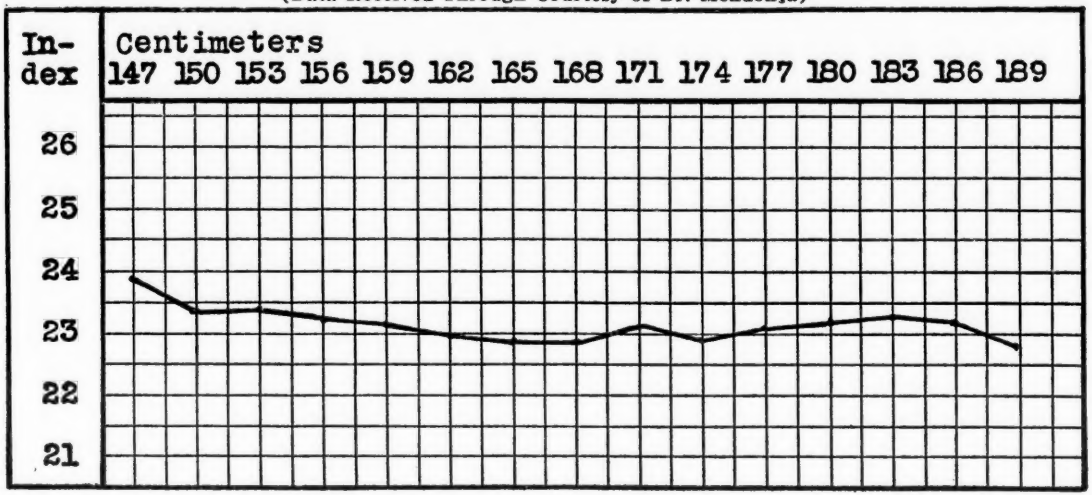
MALES

Average of All Indices for Each Height Group of Approximately 100,000 Insured Italians (Romanelli)

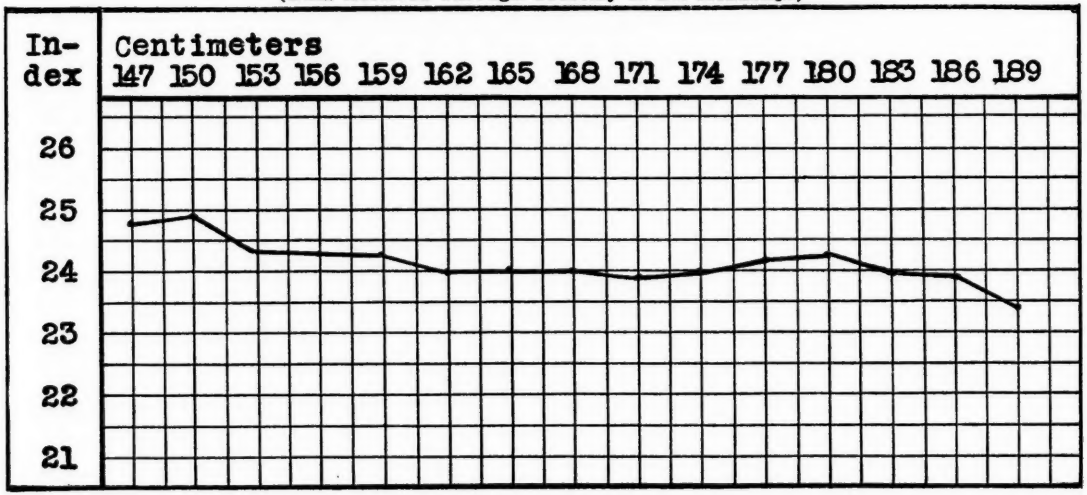
(Index Based on Height in Centimeters and Weight in Kilograms)



G
MALES
NORTHERN BRAZIL
Risks Insured by Sul America
Approximately 46,000 Risks (Age 14-70)
(Index Based on Height in Centimeters and Weight in Kilograms)
(Data Received Through Courtesy of Dr. Mendonça)



H
MALES
PERU
Risks Insured by Sul America
Approximately 15,400 Risks (Age 14-70)
(Index Based on Height in Centimeters and Weight in Kilograms)
(Data Received Through Courtesy of Dr. Mendonça)



# THE IDENTIFICATION OF GLUCOSE AND OTHER URINARY SUGARS AND REDUCING SUBSTANCES

By Wm. G. Exton, A. R. Rose and E. J. Roehl

It is well-known that our clinical tests for sugar in urine are not specific for glucose—the only sugar involved in diabetes. In fact, any sugar or even non-sugar substance having an aldehyde or ketose group in its molecule has the same appearance in the test tube as glucose, when reduced with copper, picric or di-nitro-salicylic acids, etc. This limitation of the clinical tests for sugar in urine accounts for many wrong diagnoses as well as the difficulties experienced in correctly interpreting the significance of sugar findings in applicants for life insurance. Any method that will not only detect the presence of, but also indicate the nature of a urinary reducing substance should, therefore, enable much less troublesome and far more accurate selection.

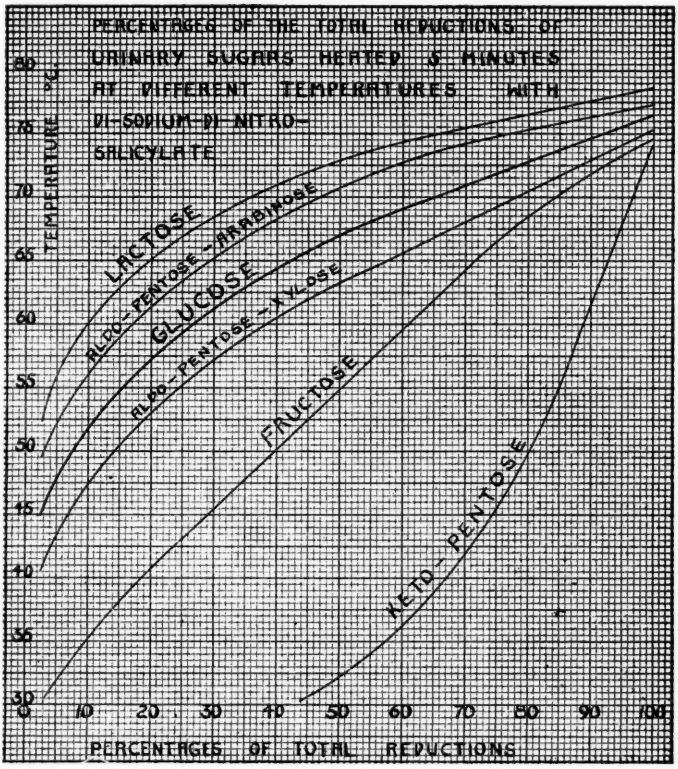
The observation of Sumner[1] that fructose reduces di-nitro-salicylic acid faster than glucose does, and the observation of Lasker and Enklewitz[2] that keto-pentose reduces Benedict's qualitative copper test at room temperature, coupled with our own experiences, led us[3] to inquire how the various urinary sugars would behave at different temperatures. The results of these studies with our di-sodium-di-nitro-salicylate reagent are shown in Figure 1.

The data shows the partial reductions of the reagent by the various sugars at temperatures lower than those necessary for complete reduction. It also shows that the partial reductions are different for each sugar and that the differences between them are great enough to enable the identification of any one of the

1. Sumner, J. B.: J. Biol. Chem., 1925, 65, 393.
2. Lasker, Margaret, and Enklewitz, Morris: J. Biol. Chem., 1933, 101, 289.
3. Exton, W. G., Rose, A. R., and Roehl, E. J.: Clinical Identification and Measurement of Urinary Sugars. Proc. Soc. Expl. Biol. Med., 1934. Vol. 32, p. 417.

sugars. From this it is evident that measurements of the partial reductions actually measure the velocity or rate at which a sugar reduces the reagent. Its velocity or rate of reduction, therefore, characterizes each sugar although all have the same appearance in the test tube when reduction is complete.

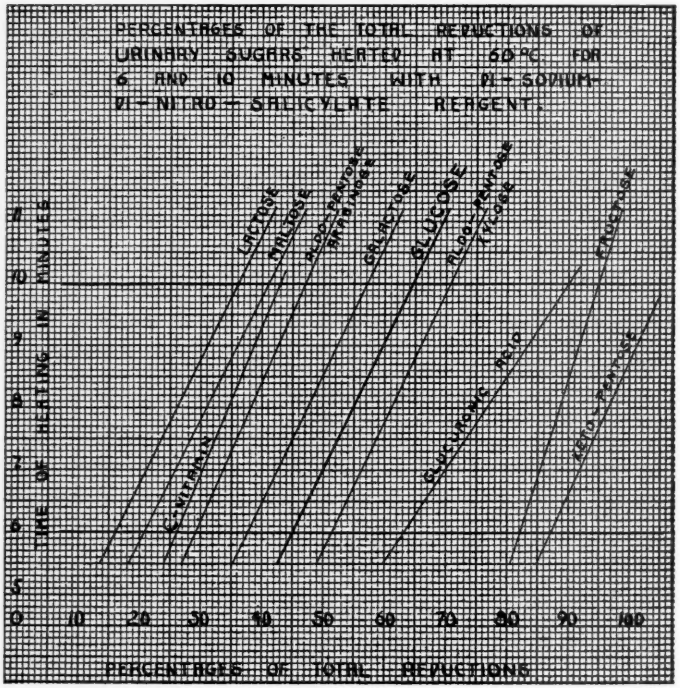
FIGURE 1




In the practical application of this principle it was found more convenient to determine the reducing characteristics of the sugars

by varying the time of heating and maintaining a constant temperature. Figure 2 shows the data secured in this way and the chart has been employed in the routine sugar urinalysis of the Prudential Laboratory during the past year.

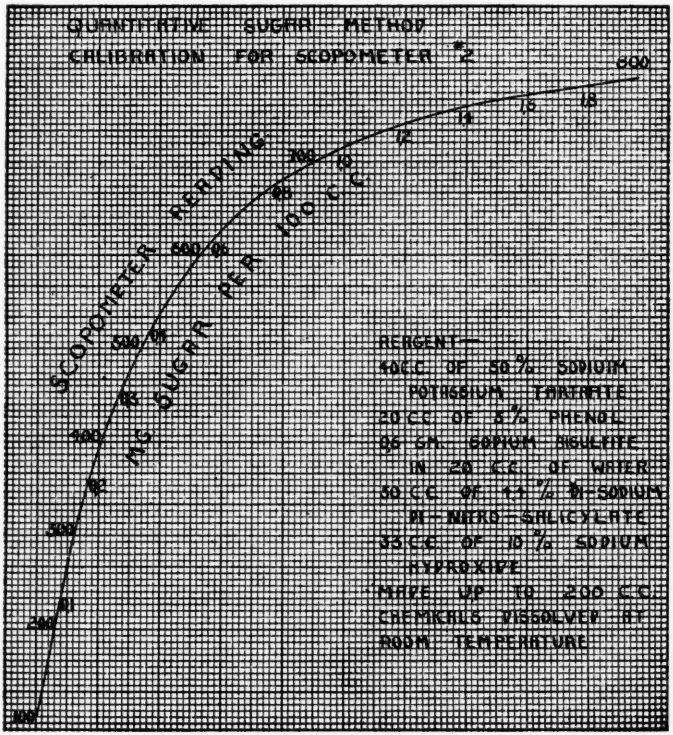
FIGURE 2


PERCENTAGES OF THE TOTAL REDUCTIONS OF URINARY SUGARS HEATED AT 60°C. FOR 6 AND 10 MINUTES WITH DI-SODIUM-DI-NITRO-SALICYLATE REAGENT.
TIME OF HEATING IN MINUTES
PERCENTAGES OF TOTAL REDUCTIONS
GLUCOSE
GALACTOSE
LACTOSE
MALTOSE

Mix 0.5 cc. urine and 10 cc. reagent and divide into two equal samples. Place sample A in a 60° water bath 10 minutes. Cool quickly in tap water and read in Scopometer. Place sample B in a 60° water bath 6 minutes. Cool, read in Scopometer, and then place in a 100° water bath 5 minutes, cool and read in Scopometer.

The sugar value equivalents of the scopometer scale readings are then picked from a calibration curve like that shown in Figure 3. When these values are calculated to percentages of the total

FIGURE 3


QUANTITATIVE SUGAR METHOD
CALIBRATION FOR SCOPOMETER #2
SCOPOMETER READING
MG. SUGAR PER 100 C.C.
REAGENT—
40 C.C. OF 50% SODIUM POTASSIUM TARTRATE
20 C.C. OF 5% PHENOL
86 GM. SODIUM SULFITE IN 20 C.C. OF WATER
50 C.C. OF 1% DI-SODIUM M-NITRO-SALICYLATE
35 C.C. OF 10% SODIUM HYDROXIDE
MAKE UP TO 200 C.C.
CHEMICALS DISSOLVED AT ROOM TEMPERATURE

reduction taking place respectively in 6 and 10 minutes at 60°, the nature of the sugar or other reducing substance is identifiable by comparing its reduction characteristics with those of the various sugars and non-sugar reducing substances seen on the chart in Figure 2. The method is improved by a preliminary clarification of the urine.

During the past year we have been checking the characteristics of reducing urines with confirmatory tests and this has enabled us to eliminate diabetes from the consideration of many glycosuria cases. The method has also supplied interesting data on the incidence and nature of urinary reducing substances which will be treated in detail in a later publication.

DR. WELLS—Gentlemen, this ends our scientific discussion, and nothing remains to be done except to close the meeting. I cannot do that, however, without thanking you very sincerely for your attendance here and for the courtesies which have been extended to me during all of the past year. I want to thank all of you who have taken part in our various discussions. I want to thank the Program Committee for their very helpful assistance, and our wonderful Secretary for his untiring efforts. I hardly know how I could have gotten along without his assistance. The work of the year has been very enjoyable. There has been plenty of it, but it is an experience that I shall remember with pleasure for years to come. It is now my pleasure to introduce your new President, Dr. Eugene Russell, Medical Director of the Mutual Life Insurance Company, New York.

DR. RUSSELL—I want you to know that I appreciate this great honor that you have conferred upon me and the Company which I represent, and you can rest assured that I will do everything within my power to forward the interests of the Association. I feel certain that with your help and coöperation we will have a very successful year. I know we all appreciate the efforts that Dr. Wells has put forth in his program, and it is going to be very difficult to reach the heights which this program has attained.

Dr. Christiernin—I move that this Association express its appreciation and thanks to Dr. Wells for the capable manner in which he has administered his office, and for the excellent quality of the papers and the discussions which he has prepared for us in this program.

The motion was seconded and carried, and the meeting adjourned.

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| William Bolt, M. D. | New York Life, New York City. |
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| J. Thornley Bowman, M. D. | London Life, London, Ont. |
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| Chester T. Brown, M. D. | Prudential, Newark, N. J. |
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| Edward J. Campbell, M. D. | New York Life, New York City. |

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| Charles L. Christiernin, M. D. | Metropolitan Life, New York City. |
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| Gates Collier, M. D. | Security Mutual, Binghamton, N. Y. |
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| Henry W. Cook, M. D. | Northwestern National, Minneapolis, Minn. |
| Parker M. Cort, M. D. | Aetna Life, Hartford, Conn. |
| Donald B. Cragin, M. D. | Aetna Life, Hartford, Conn. |
| Hugh W. Crawford, M. D. | Columbian National, Boston, Mass. |
| Hamilton C. Cruikshank, M. D. | Manufacturers Life, Toronto, Ont. |
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| Henry K. Dillard, M. D. | Penn Mutual, Philadelphia, Pa. |
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| John Ferguson, M. D. | Excelsior Life, Toronto, Ont. |
| William E. Ferguson, M. D. | Excelsior Life, Toronto, Ont. |
| Ralph M. Filson, M. D. | Travelers, Hartford, Conn. |
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| Robert A. Fraser, M. D. | New York Life, New York City. |
| Edward M. Freeland, M. D. | New York Life, New York City. |

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| Homer Gage, M. D. | State Mutual, Worcester, Mass. |
| Frank I. Ganot, M. D. | Prudential, Newark, N. J. |
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| Henry W. Gibbons, M. D. | California Western States, Sacramento, Calif. |
| Ralph T. Gilchrist, M. D. | Northwestern Mutual, Milwaukee, Wis. |
| Robert A. Goodell, M. D. | Phœnix Mutual, Hartford, Conn. |
| Alvah H. Gordon, M. D. | London & Scottish, Montreal, Que. |
| John K. Gordon, M. D. | Sun Life, Montreal, Que. |
| Angus Graham, M. D. | London Life, London, Ont. |
| LeRoy C. Grau, M. D. | Travelers, Hartford, Conn. |
| Robert J. Graves, M. D. | United Life & Accident, Concord, N. H. |
| Frank L. Grosvenor, M. D. | Travelers, Hartford, Conn. |
| Frederick W. Hagney, M. D. | Mutual Benefit, Newark, N. J. |
| Llewellyn Hall, M. D. | Phœnix Mutual, Hartford, Conn. |
| F. Tulley Hallam, M. D. | State Life, Indianapolis, Ind. |
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| George A. Harlow, M. D. | Northwestern Mutual, Milwaukee, Wis. |
| Frank Harnden, M. D. | Berkshire Life, Pittsfield, Mass. |
| Walter C. Hausheer, M. D. | Prudential, Newark, N. J. |

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| William D. Heaton, M. D. | New York Life, New York City. |
| Charles A. Heiken, M. D. | Home Life, Philadelphia, Pa. |
| Ernest M. Henderson, M. D. | Confederation Life, Toronto, Ont. |
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| William W. Hobson, M. D. | Reliance Life, Pittsburgh, Pa. |
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| Chauncey O. Hollinger, M. D. | Prudential, Newark, N. J. |
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| Charles E. Homan, M. D. | Connecticut Mutual, Hartford, Conn. |
| Joseph C. Horan, M. D. | Metropolitan Life, New York City. |
| James H. Humphries, M. D. | Home Life, New York City. |
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| Washington C. Huyler, M. D. | Mutual Life, New York City. |
| Charles E. Iliff, M. D. | Western and Southern Life, Cincinnati, Ohio. |
| Albert S. Irving, M. D. | Prudential, Newark, N. J. |
| Charles B. Irwin, M. D. | North American, Chicago, Ill. |
| Walter A. Jaquith, M. D. | Columbus Mutual, Columbus, Ohio. |
| Frank L. B. Jenny, M. D. | Federal Life, Chicago, Ill. |
| Albert O. Jimenis, M. D. | Metropolitan Life, New York City. |

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| Albert E. Johann, M. D. | Bankers Life, Des Moines, Iowa. |
| George E. Kanouse, M. D. | Prudential, Newark, N. J. |
| Edward A. Keenleyside, M. D. | Connecticut General Life, Hartford, Conn. |
| Frank W. Kenney, M. D. | Capitol Life, Denver, Colo. |
| Oscar W. King, M. D. | Equitable Life Assurance, New York City. |
| Henry B. Kirkland, M. D. | Prudential, Newark, N. J. |
| Robert J. Kissock, M. D. | Metropolitan Life, New York City. |
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| Ivan C. Lawler, M. D. | New York Life, New York City. |
| Linford H. Lee, M. D. | Pacific Mutual, Los Angeles, Calif. |
| John M. Livingston, M. D. | Mutual Life of Canada, Waterloo, Ont. |
| G. Carroll Lockard, M. D. | Maryland Life, Baltimore, Md. |
| H. Clive McAlister, M. D. | Lincoln National, Ft. Wayne, Ind. |
| Milton T. McCarty, M. D. | Peoples Life, Frankfort, Ind. |
| Francis H. McCrudden, M. D. | New England Mutual, Boston, Mass. |
| Carleton B. McCulloch, M. D. | State Life, Indianapolis, Ind. |
| Albert A. MacDonald, M. D. | National Life of Canada, Toronto, Ont. |
| Arthur J. McGanity, M. D. | Dominion Life Assurance, Waterloo, Ont. |
| William A. McGuire, M. D. | General American, St. Louis, Mo. |
| Lewis F. MacKenzie, M. D. | Prudential, Newark, N. J. |

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| Walter T. McNaughton, M. D. | Old Line Life, Milwaukee, Wis. |
| Frederick W. McSorley, M. D. | Equitable Life Assurance, New York City. |
| Charles Maertz, M. D. | Union Central, Cincinnati, Ohio |
| Henry L. Mann, M. D. | Equitable Life Assurance, New York City. |
| Robert W. Mann, M. D. | Imperial Life, Toronto, Ont. |
| William L. Mann, M. D. | Great West, Winnipeg, Man. |
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| Oscar F. Maxon, M. D. | Franklin Life, Springfield, Ill. |
| Samuel W. Means, M. D. | Metropolitan Life, New York City. |
| William H. Miller, M. D. | Equitable Life Assurance, New York City. |
| James T. Montgomery, M. D. | Southland Life, Dallas, Texas. |
| Robert C. Montgomery, M. D. | Manufacturers Life, Toronto, Ont. |
| John F. Moore, Jr., M. D. | Mutual Life, New York City. |
| William D. Morgan, M. D. | Phœnix Mutual, Hartford, Conn. |
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| Alvin E. Murphy, M. D. | Prudential, Newark, N. J. |
| Charles T. Necker, M. D. | Dominion Life, Waterloo, Ont. |
| Charles F. Nichols, M. D. | Penn Mutual Life, Philadelphia, Pa. |
| John B. Nichols, M. D. | Acacia Mutual Life, Washington, D. C. |
| James Norman, M. D. | National Life Assurance, Toronto, Ont. |

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| James H. North, M. D. | New York Life, New York City. |
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| James H. Ready, M. D. | General American, St. Louis, Mo. |
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| Frank P. Righter, M. D. | Atlantic Life, Richmond, Va. |
| George P. Robb, M. D. | Metropolitan Life, New York City. |

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| William C. Roberts, M. D. | New York Life, New York City. |
| A. J. Robinson, M. D. | Connecticut General, Hartford, Conn. |
| Thomas H. Rockwell, M. D. | Equitable Life Assurance, New York City. |
| Oscar H. Rogers, M. D. | New York Life, New York City. |
| Henry B. Rollins, M. D. | Connecticut Mutual, Hartford, Conn. |
| Fred W. Rolph, M. D. | Confederation Life, Toronto, Ont. |
| Gordon Ross, M. D. | Massachusetts Mutual, Springfield, Mass. |
| Robert L. Rowley, M. D. | Phœnix Mutual, Hartford, Conn. |
| Charles L. Rudasill, M. D. | Life Insurance Company of Virginia, Richmond, Va. |
| Samuel C. Rumford, M. D. | Continental American, Wilmington, Del. |
| Eugene F. Russell, M. D. | Mutual Life, New York City. |
| H. Crawford Scadding, M. D. | Canada Life, Toronto, Ont. |
| C. E. Schilling, M. D. | Ohio State, Columbus, Ohio. |
| Samuel B. Scholz, Jr., M. D. | Penn Mutual, Philadelphia, Pa. |
| Albert Seaton, M. D. | American Central, Indianapolis, Ind. |
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| Arthur L. Sherrill, M. D. | Equitable Life Assurance, New York City. |
| Daniel M. Shewbrooks, M. D. | Penn Mutual, Philadelphia, Pa. |
| Ross L. Shields, M. D. | Mutual Life, Waterloo, Ont. |

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| Ralph R. Simmons, M. D. | Equitable Life, Des Moines, Iowa. |
| Joseph L. Siner, M. D. | Fidelity Mutual, Philadelphia, Pa. |
| Donald W. Skeel, M. D. | Occidental Life, Los Angeles, Calif. |
| DeWitt Smith, M. D. | Southwestern Life, Dallas, Texas. |
| Malcolm K. Smith, M. D. | Prudential, Newark, N. J. |
| William B. Smith, M. D. | Connecticut Mutual, Hartford, Conn. |
| Morton Snow, M. D. | Massachusetts Mutual, Springfield, Mass. |
| Marion Souchon, M. D. | Pan-American Life, New Orleans, La. |
| Henry F. Starr, M. D. | Pilot Life, Greensboro, N. C. |
| John B. Steele, M. D. | Volunteer State, Chattanooga, Tenn. |
| David F. Steuart, M. D. | Mutual Benefit, Newark, N. J. |
| Hector M. Stevenson, M. D. | Aetna Life, Hartford, Conn. |
| I. Read Stidger, M. D. | Prudential, Newark, N. J. |
| Arthur C. Stokes, M. D. | Guarantee Mutual Life, Omaha, Neb. |
| Archibald R. Stone, M. D. | Midland Mutual, Columbus, Ohio. |
| S. J. Streight, M. D. | Canada Life, Toronto, Ont. |
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| Bion C. Syverson, M. D. | Equitable Life Assurance, New York City. |
| Harold F. Taylor, M. D. | Aetna Life, Hartford, Conn. |
| William Thorndike, M. D. | Northwestern Mutual, Milwaukee, Wis. |
| Walter E. Thornton, M. D. | Lincoln National, Ft. Wayne, Ind. |

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| Ira G. Towson, M. D. | Fidelity Mutual Life, Philadelphia, Pa. |
| Wallace Troup, M. D. | Metropolitan Life, New York City. |
| Frank L. Truitt, M. D. | Reserve Loan Life, Indianapolis, Ind. |
| Henry B. Turner, M. D. | Metropolitan Life, New York City. |
| John S. Turner, M. D. | Southland Life, Dallas, Texas. |
| Harry E. Ungerleider, M. D. | Equitable Life Assur., New York City. |
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| Albert A. Wagner, M. D. | Reliance Life, Pittsburgh, Pa. |
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| Faneuil S. Weisse, M. D. | Mutual Life, New York City. |
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| Fred L. Wells, M. D. | Equitable Life Insurance, Des Moines, Iowa. |
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| Chester F. S. Whitney, M. D. | Home Life, New York City. |
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| A. Burton Wilkes, M. D. | Metropolitan Life, New York City. |
| Alfred A. Willander, M. D. | Mutual Trust Life, Chicago, Ill. |

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| Thomas H. Willard, M. D. | Metropolitan Life, New York City. |
| Ennion S. Williams, M. D. | Life Insurance Co. of Va., Richmond, Va. |
| Richard L. Willis, M. D. | Mutual Life, New York City. |
| Charles H. Willits, M. D. | Provident Mutual, Philadelphia, Pa. |
| Edmund W. Wilson, M. D. | Metropolitan Life, New York City. |
| McLeod G. Wilson, M. D. | Travelers, Hartford, Conn. |
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| G. Elliott Woodford, M. D. | Home Life, New York City. |
| Lauritz S. Ylvisaker, M. D. | Prudential, Newark, N. J. |
| Arthur W. Young, M. D. | Sun Life Assurance, Montreal, Quebec. |

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| Capitol Life, Denver, Colo. | F. W. Kenney, M. D. |
| Central Life Assurance Society, Des Moines, Iowa. | M. I. Olsen, M. D. |

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| Columbian National Life, Boston, Mass. | Hugh W. Crawford, M. D. |
| Columbus Mutual Life, Columbus, Ohio. | W. A. Jaquith, M. D. |
| Commonwealth Life, Louisville, Ky. | W. F. Blackford, M. D. |
| Confederation Life Ass'n., Toronto, Ont. | E. M. Henderson, M. D.<br>F. W. Rolph, M. D. |
| Connecticut General Life, Hartford, Conn. | N. J. Barker, M. D.<br>Edw. A. Keenleyside, M. D.<br>A. J. Robinson, M. D. |
| Connecticut Mutual Life, Hartford, Conn. | C. D. Alton, M. D.<br>C. E. Homan, M. D.<br>C. B. Piper, M. D.<br>H. B. Rollins, M. D.<br>W. B. Smith, M. D. |
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| Continental Assurance Co., Chicago, Ill. | H. W. Dingman, M. D. |
| Continental Life, St. Louis, Mo. | C. R. Dudley, M. D. |
| Crown Life, Toronto, Ont. | H. D. Delamere, M. D. |
| Dominion Life Assurance, Waterloo, Ont. | A. J. McGanity, M. D.<br>C. T. Necker, M. D. |

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| Equitable Life Assur. Soc., New York City. | E. W. Beckwith, M. D.<br>F. G. Brathwaite, M. D.<br>R. M. Daley, M. D.<br>P. G. Denker, M. D.<br>A. D. Ghiselin, M. D.<br>O. W. King, M. D.<br>F. W. McSorley, M. D.<br>H. L. Mann, M. D.<br>W. H. Miller, M. D.<br>T. H. Rockwell, M. D.<br>A. L. Sherrill, M. D.<br>B. C. Syverson, M. D.<br>H. E. Ungerleider, M. D. |
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| Excelsior Life, Toronto, Ont. | John Ferguson, M. D.<br>W. E. Ferguson, M. D. |
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| Fidelity Mutual Life, Philadelphia, Pa. | J. T. Sheridan, M. D.<br>J. L. Siner, M. D.<br>I. G. Towson, M. D. |
| Franklin Life, Springfield, Ill. | O. F. Maxon, M. D. |
| General American Life, St. Louis, Mo. | W. A. McGuire, M. D.<br>J. H. Ready, M. D. |
| Great Southern Life, Houston, Texas. | J. E. Daniel, M. D. |
| Great West Life Assurance, Winnipeg, Man., Can. | W. L. Mann, M. D. |
| Guarantee Mutual, Omaha, Neb. | A. C. Stokes, M. D. |

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| Guardian Life, New York City. | M. B. Bender, M. D. |
| Home Life, New York City. | J. H. Humphries, M. D.<br>C. F. S. Whitney, M. D.<br>G. E. Woodford, M. D. |
| Home Life of America, Philadelphia, Pa. | C. A. Heiken, M. D. |
| Imperial Assur. Co. of Canada, Toronto, Ont. | H. B. Anderson, M. D.<br>R. W. Mann, M. D. |
| Jefferson Standard Life, Greensboro, N. C. | J. T. J. Battle, M. D. |
| John Hancock Mutual Life, Boston, Mass. | E. H. Allen, M. D.<br>W. B. Bartlett, M. D.<br>R. A. Behrman, M. D.<br>William L. Davis, M. D.<br>Byam Hollings, M. D. |
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| Life Ins. Co. of Virginia, Richmond, Va. | C. L. Rudasill, M. D.<br>E. S. Williams, M. D. |
| Lincoln National Life, Fort Wayne, Ind. | H. C. McAlister, M. D.<br>W. E. Thornton, M. D. |
| London & Scottish Assur. Ass'n., Montreal, Que. | A. H. Gordon, M. D. |
| London Life, London, Ont. | J. T. Bowman, M. D.<br>Angus Graham, M. D. |
| Manhattan Life, New York City. | G. H. Barber, M. D. |
| Manufacturers Life, Toronto, Ont. | H. C. Cruikshank, M. D.<br>R. C. Montgomery, M. D. |

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| Maryland Life, Baltimore, Md. | G. Carroll Lockard, M. D. |
| Massachusetts Mutual Life, Springfield, Mass. | R. B. Andrews, M. D.<br>H. B. Brown, M. D.<br>L. D. Chapin, M. D.<br>R. B. Ober, M. D.<br>Gordon Ross, M. D.<br>Morton Snow, M. D. |
| Metropolitan Life, New York City. | C. C. Berwick, M. D.<br>E. C. Bonnett, M. D.<br>Albert O. Bromer, M. D.<br>C. L. Christiernin, M. D.<br>R. K. Farnham, M. D.<br>H. H. Fellows, M. D.<br>D. C. Hoffman, M. D.<br>J. C. Horan, M. D.<br>A. O. Jimenis, M. D.<br>R. J. Kissock, M. D.<br>A. J. Lanza, M. D.<br>S. W. Means, M. D.<br>William P. Reed, M. D.<br>George P. Robb, M. D.<br>Wallace Troup, M. D.<br>Henry A. Turner, M. D.<br>A. B. Wilkes, M. D.<br>T. H. Willard, M. D.<br>E. W. Wilson, M. D. |
| Midland Mutual Life, Columbus, Ohio. | A. R. Stone, M. D. |
| Minnesota Mutual Life, St. Paul, Minn. | T. H. Dickson, Jr., M. D. |
| Mutual Benefit Life, Newark, N. J. | C. P. Clark, M. D.<br>F. W. Hagney, M. D.<br>W. A. Reiter, M. D.<br>D. F. Steuart, M. D.<br>E. V. Sweet, M. D.<br>G. A. Van Wagenen, M. D.<br>W. R. Ward, M. D. |
| Mutual Life Assur. Co. of Can., Waterloo, Ont. | J. M. Livingston, M. D.<br>R. L. Shields, M. D. |

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| West Coast Life Insurance Co.,<br>San Francisco, Calif. | M. O. Austin, M. D. |
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| Albert W. Billing, M. D. | New York, N. Y. |
| Robert J. Blanchard, M. D. | Winnipeg, Man., Can. |
| William R. Bross, M. D. | New York, N. Y. |
| Chauncey R. Burr, M. D. | New York, N. Y. |
| Robert L. Burrage, M. D. | Newark, N. J. |
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## THE ASSOCIATION OF LIFE INSURANCE MEDICAL DIRECTORS OF AMERICA

### 1920-1935


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